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UNIVERSITY OF TORONTO

Faculty of Medicine

REPORT OF THE DEAN

OF THE

FACULTY OF MEDICINE

SESSION 1938-1939

THE UNIVERSITY OF TORONTO PRESS

UNIVERSITY OF TORONTO

FACULTY OF MEDICINE

Toronto, June 30th, 1939

To the Graduates in Medicine of the University of Toronto,

The Annual Report of the Dean of the Faculty of Medicine for the Session 1938-1939 is, with good wishes and greetings, sent to you herewith.

W. E. Gallie, M.D.,
Dean.

THE ANNUAL REPORT OF THE DEAN OF THE FACULTY OF MEDICINE

W. E. Gallie, M.D., F.R.C.S.

The annual report of the Dean of the Faculty of Medicine had its beginning in a brief review of the activities of the Faculty which was used by the President in writing his annual report. It has gradually changed, however, until now it takes the form of a letter to all the graduates, which seems to be very generally read and which, judging from the many approving comments we have received, is welcomed by them as a contact with their Alma Mater.

The most important changes that have occurred in the Faculty during this year are related to the curriculum and examinations for first year students. It has been pointed out in previous reports that the number of students in this school has gradually increased until they have seriously taxed the clinical facilities of our hospitals and made it difficult for us to maintain a standard such as that of those schools in which the numbers of students have been limited. To this difficulty is added the fact that many students have been able to enter medicine who have no aptitude whatever for a long and difficult course of study. The result has been that they have had failures year after year and have not only had a miserable time themselves but have retarded the general advancement of the class as a whole.

The obvious remedy would be to establish some form of test during the premedical year which would enable the faculty to detect at an early stage those students who are unsuited to the course and to eliminate them before it is too late for them to make a start in some more suitable form of life work. This plan has been adopted and has proved successful in quite a large group of students who had obviously made a mistake in their choice of a profession.

Unfortunately, among the fallen have appeared the names of the sons of some of our graduates and, indeed, of the sons

of members of the faculty, and as a failure in the first year means that these students may not continue, it would appear that the time is ripe for a plain statement of the character of the course in medicine in this university.

All students from the Province of Ontario are admitted to the first year of the medical course, if they have their pass matriculation in twelve papers and their honour matriculation in English; Mathematics; French or German; and Physics and Chemistry or Botany and Zoology. A limited number of students from the sister provinces, particularly those with no medical school, are admitted, if they present certificates of a standard equivalent to that of Ontario. Occasionally, applications from the sons of our graduates who have moved away from Canada are favorably received.

During the autumn of the first year the student tries the "Scholastic Aptitude Test" for Medical Schools, of the Association of American Medical Colleges, a written paper consisting of a mixture of 350 to 400 questions designed to discover whether he has the type of mind that is suitable for a medical career. The results are filed with his matriculation record and with the marks he makes in the various term tests throughout the year. The final examination in May is composed of papers in Biology, Physics and Chemistry, in which fifty percent must be obtained in each subject and sixty percent on the average, and papers in French or German and in The History of Science and Civilization in which fifty percent is the passing standard. A failure in the science group eliminates the candidate from the course, but a supplemental examination may be taken in the Fall if he is down in one of the languages or in The History of Civilization. No one may repeat the first year and the only way a student could get back into the medical course would be by transferring to the Arts Faculty and obtaining a degree in a course which included the equivalent of our first year.

A rather important change is being made this year in the curriculum of the first year as it has been represented that too much emphasis has been placed on the foreign language. Hereafter, therefore, the student may select, if he chooses, in place of the foreign language, a course in English or a course in Modern History. In place also of History of Science

and Civilization, he may select a course in Philosophy or one in Anthropology. Fifty percent must be obtained at the examination to secure a pass standing and one supplemental can be taken in the Fall. These courses will be conducted by the Faculty of Arts.

While these changes in no way lessen the difficulties of the first year, except for those students who are lacking in aptitude for foreign languages, they do broaden the field considerably and enable the student to select, in addition to his pre-medical sciences, a course of study in cultural subjects which will be of great value to him in later years.

The second and third years are devoted to anatomy, physiology, biochemistry, embryology, histology, psychology and general pathology. They are very busy years during which the student is employed all day long in laboratory or lecture hall and he must devote a great deal of time to reading. He has very little opportunity for indulging outside interests.

The fourth, fifth and sixth years are the clinical years and a large part of the time is spent in the study of medicine, surgery, obstetrics and the specialties in the hospitals (Toronto General, St. Michael's, Toronto Western and the Hospital for Sick Children). In addition, extensive courses are given in hygiene and preventive medicine, pathology, pathological chemistry, pharmacology, therapeutics, bacteriology, radiology and radiotherapy and physiotherapy. The sixth year is almost equivalent to an intern year as the student spends ten weeks in hospital in medicine, ten weeks in surgery and ten weeks in obstetrics and the specialties. From a practical standpoint it is the most valuable year in the course.

Scattered through the three clinical years are short courses on medical jurisprudence and toxicology, history of medicine, dentistry, medical ethics and economics, life insurance and applied physiology.

In the second and third years, the student who has passed in all but one subject, is eligible to proceed to the next year, provided he passes the supplemental examinations in the Fall; whereas in the fourth, fifth and sixth years, he may write supplemental examinations in two subjects. A failure to pass in more than one subject in the second or third year, or in more than two subjects in the last three years, or a

failure to pass the supplemental examinations, causes him to lose his year and puts him in the position of either dropping out of the course, or applying for permission to repeat the entire work of the year. A failure at the end of a year in which he is repeating the course eliminates him from the course.

From this it will be seen that the course for the degree of Doctor of Medicine can no longer be faced without careful consideration. The student who enters should be physically fit and should be a good student, that is, one who has obtained high grades at matriculation, who is capable of facing difficult courses of study with reasonable prospects of success and who is willing to work hard. Students who enter Medicine with credits in Matriculation, with a low standing in their scholastic aptitude test and with a grade of fifty percent or lower in their first year examinations have been shown almost invariably to have failures throughout their course, so that the faculty has no doubt whatever that the best plan for the school, and in the end, the kindest plan for the student is to eliminate him from the course at once and let him start over again in something else before it is too late.

To our graduates, therefore, I would suggest that they consider carefully their boy's natural aptitude for this type of study before allowing him to register and when this is finally decided upon I would recommend that from among the matriculation options he select biology, physics and chemistry and that he secure his matriculation by the road of the departmental examinations rather than by recommendation. The experience gained in these examinations will be useful to him at the end of his first year in the university.

I cannot refrain from commenting sadly on the necessity for the general raising of the annual fees, owing to the reduction of the annual government grant to the university. Since thirty years ago the increases in fees and the length of the course has made the cost of a medical education three times what it formerly was. Had the cost been anything like as much in the early part of this century very few of the present professors could have entered medicine. The result is that a smaller and smaller proportion of the bright

boys from farm and village are coming up to the university, much to the disadvantage of the professions.

During this year the Faculty of Medicine was requested by the Board of Governors to suggest a plan of reorganization of the University Health Service. A committee of the faculty studied this question carefully and came to the conclusion that the present service was inadequate and could be much improved in certain directions. These were first, in the complete physical examination of all students with a view to the detection of physical defects and incipient disease; second, in providing primary medical attention particularly for students in residence or boarding houses who are taken ill or are injured; and third, the inauguration of a general course of lectures on problems of hygiene and health. The plan was approved in general by the Board of Governors, but owing to the expense involved, action was deferred. In the case of the medical students, however, an enlargement of the service was introduced in the form of a tuberculin test and an X-ray of the chest in those who were found positive, followed by a careful examination in those in whom suspicious signs were discovered. It has been felt that by these measures the incidence of serious pulmonary tuberculosis might be reduced.

Reference to the departmental reports will indicate the vast amount of research at present going on in the various laboratories. It is always difficult to predict the importance of many of these studies, but those that are brought to a conclusion always add something to the sum total of our knowledge and often form the basis of real progress in medicine. Some of them, among which are those on silicosis and on heparin have already been shown to be of great practical value. For their work on silicosis, Dr. D. A. Irwin of the Department of Medical Research and Dr. W. D. Robson of the McIntyre Porcupine Mines were awarded the McCharles Prize and for his work on the use of heparin, Dr. Gordon Murray was appointed Hunterian Professor in the Royal College of Surgeons of England.

The Charles Mickle Fellowship for this year was awarded to Charles Herbert Best, M.A., M.D., D.Sc., London, F.R.S., F.R.S.C., F.R.C.P., Professor of Physiology, University of Toronto, Acting Head of the Department of Physiological

Hygiene, Research Associate in the Banting and Best Department of Medical Research and Associate Director of the Connaught Laboratories, for his contributions in certain branches of physiology, in particular, those related to diabetes and carbohydrate metabolism, to histamine and histaminose, to choline and fat metabolism and to heparin and thrombosis. This fellowship is awarded each year to that individual, wherever he may be, who in the opinion of this faculty has contributed most during the preceding ten years to advance sound knowledge of a practical kind in medical art or science. The award of the Charles Mickle Fellowship to Dr. Best will be approved by all for not only is he one of the most distinguished among physiologists, but his contributions have been of such intensely practical importance that they are understood and gratefully acknowledged by the whole world.

Dr. Best is also in receipt of the Baly Gold Medal awarded by the Royal College of Physicians, for his physiological researches.

Honours have come to Professor Duncan Graham in the form of election as President-elect of the Canadian Medical Association, to Professor J. H. Elliott, who has been appointed representative for Canada in place of Dr. Vallee, on the Council of the International Association of the History of Medicine, and Vice-President of the Section of the History of Medicine of the American Medical Association, to Dr. Trevor Owen, who has been elected to Fellowship in the Royal College of Physicians of London, to Dr. D. E. Robertson, who was made President-elect of the American Orthopaedic Association, President of the Academy of Medicine and Vice-president of the American Surgical Association, and to Sir Frederick Banting in being chosen to give the W. E. Dixon Memorial Lecture of the Royal Society of Medicine.

The Balfour Lecture was delivered on Lister Day, April 5th, by Mont. R. Reid, A.B., M.D., Professor of Surgery, College of Medicine, University of Cincinnati. The subject was "Personal Experiences with Vascular Problems" and was a beautiful realization of the purposes that the founder had in mind that our students should from time to time be given the opportunity to meet distinguished surgeons from other lands

and to hear them discuss the subjects that have made them famous.

The Charles Mickle Lecture was delivered on October 4th, by Sir Edward Mellanby, K.C.B., M.D., F.R.S., on "Recent Researches in Nutrition". It will be recalled that the Charles Mickle Fellowship was awarded in 1935 to Sir Edward and Lady Mellanby. Unfortunately, Lady Mellanby was ill and could not be present, but Sir Edward has suggested that on some future occasion she may be able to lecture here.

Post graduate courses were conducted in the latter part of September by the Department of Medicine on Metabolic and Endocrine Disorders and by a combination of the Departments of Gynaecology, Radiology and Surgery on Cancer. These courses were well attended and evidently appreciated. The idea of spending a whole week in the intensive study of some one important subject has become well established and the courses will be continued.

In addition to these special post graduate courses, ninety-two addresses were given by fifty-four speakers from the Faculty of Medicine, under the auspices of the Ontario Medical Association.

The new members who have joined the faculty this year are Dr. J. K. W. Ferguson and Dr. Leslie Young. Dr. Ferguson is a graduate in Arts and Medicine from this university and comes now from the Department of Physiology in the University of Iowa to be Assistant Professor of Pharmacology with Professor V. E. Henderson. Dr. Young comes from the Department of Biochemistry at University College, London, to be Associate Professor here.

Professor G. F. Marrian, who has been in the Department of Biochemistry here since 1933, has resigned to accept an appointment as Professor of Chemistry in Relation to Medicine in the University of Edinburgh. Professor Marrian is a most distinguished young chemist who has already made a name for himself in his researches on the sex hormones (referred to in previous reports) and the honour of appointment to the important chair in Edinburgh is richly deserved.

The promotions and new appointments for the year are as follows:

Art Service: Miss E. Hopper to replace Miss Foster, who has resigned.

Banting and Best Department of Medical Research: Dr. G. E. Hall to be promoted from Associate Professor to Professor.

Biochemistry: Dr. A. M. Wynne, Professor, from Associate Professor.

Physiology: Dr. D. Y. Solandt, Associate Professor, from Assistant Professor.

Radiology: Dr. A. C. Singleton, Assistant Professor, from Associate.

School of Hygiene: Drs. E. W. McHenry and D. L. McLean, Associate Professors, from Assistant Professors.

Retiring, June, 1939. Dr. A. G. McPhedran and Dr. H. C. Parsons, to whom reference is made in the report of the Department of Medicine. Dr. P. G. Goldsmith, Professor of Oto-Laryngology. Dr. Goldsmith has been head of his department since 1922 and during that time has brought it to a position of distinction among the otolaryngological teaching units of America. The Faculty sincerely regrets that the time has come for his retirement from university work and hopes that he will have many years of enjoyment of the practice of his profession.

It is my sad duty to record the deaths during the past year, of an unusually long list of distinguished men, who did much to bring this school to the position it occupies to-day. They are Dr. W. B. Hendry, formerly Professor of Obstetrics and Gynaecology, Dr. James Playfair McMurrich, formerly Professor of Anatomy, Dr. A. J. Mackenzie of the Department of Medicine, Dr. Gilbert Royce, formerly Associate Professor in the Department of Otolaryngology and Dr. W. B. Thistle, formerly Professor in the Department of Medicine.

MEDALS, PRIZES, FELLOWSHIPS, SCHOLARSHIPS AND BURSARIES

Awarded by the Senate of the University
Faculty of Medicine

The Faculty Gold Medal.....D. H. Copp, B.A.
The Faculty Silver Medal.....J. C. McCulloch
The Faculty Silver Medal.....R. F. Gerred
The Ellen Mickle Fellowship.....D. H. Copp, B.A.
The Chappell Prize in Clinical Surgery.....C. C. Gray

The William John Hendry Memorial Scholarship in Obstetrics and Gynaecology.....D. H. Copp, B.A.
The Ontario Medical Association Prize in Preventive Medicine
D. H. Copp, B.A.
The David Dunlap Memorial Scholarship.....W. R. Read

UNDERGRADUATE

The David Dunlap Memorial Scholarships:
(*a*) Fifth Year.....T. A. Fraser, M.A.
(*a*) Third Year.....H. H. Fireman
The Ronald S. Saddington Medal in Pathology.....E. Lampert
The John Copp Bursary.....C. A. Stephens
The B'nai B'rith Scholarship.....W. Wise
The Toronto Women's League of the United Synagogue..J. P. G. Maroosis
The Baptie Scholarship.....D. M. Boyd

GRADUATE

The Reeve Prize.....D. P. Lloyd, B.Sc. (McGill), B.A., Ph.D.Oxon.
The Starr Gold Medal.....R. E. Haist, M.A., M.D.
The Alexander McPhedran Research Fellowship in Clinical Medicine
J. L. A. Fowler, M.D.
The Faulkner Medal in Psychiatry.....D. R. Easton, M.D., D.Psych.
The J. J. Mackenzie Fellowship in Pathology and Bacteriology
W. B. Charles, M.D.
The George Brown Memorial Scholarship in Medical Science
J. P. Fletcher, M.A., M.D.
The George Armstrong Peters Prize.....E. H. Botterell, M.D., M.S.

REGISTRATION OF STUDENTS IN THE FACULTY OF MEDICINE

SESSION 1939-1940

	Men	*Wmen*	*Total*
First Year	141	7	148
Second Year	116	10	126
Third Year	110	7	117
Fourth Year	111	7	118
Fifth Year	128	9	137
Sixth Year	122	10	132
D.P.H.	20	1	21
D.R.	1	0	1
D.Psych.	6	0	6
B.Sc.(Med.)	2	0	2
Post Graduate	2	0	2
	759	51	810

DEPARTMENT OF ANATOMY

(*Under the direction of Professor J. C. B. Grant*)

There were working in the Department of Anatomy during the session 1938-1939.

Medical Students: Second Year, 107; Third Year, 119.

Students of Biological and Medical Sciences: Third Year, 11 (with second year medicine); Fourth Year, 11 (with third year medicine).

Dental Students: Second Year, 47.

Post Graduate Students: (Neurology) 1, (Gross Anatomy, Ph.D. Minor) 1, (Anatomy, B.Sc. Dent.) 1, (Gross Anatomy, occasional and Neurology) 1, (Embryology) 3, 3 took regular Histology course, 2 (special work towards M.A. degree in Histology), 1 (special work on problem in Histology), 1 (working toward Ph.D.), 2 (Special Histology option), making a total of 311.

Of these a number elected Anatomical subjects as options as follows: Third Year—Cytology, 5 (Dr. Piersol); Third Year—Special Histology, 9 (Dr. Ham).

Courses in Elementary Anatomy were given by Dr. George to 186 students, as follows: Graduate Nurses from School of Nursing, 28; First Year in Occupational Therapy, 26; Second Year in Occupational Therapy, 22; First Year in Physiotherapy, 26; Second Year in Physiotherapy, 18.

Courses in Physical Education were given by Miss McMurrich to 66 students, as follows: Margaret Eaton School Juniors, 22; Margaret Eaton School Seniors, 31; Second Year Arts, 10; Third Year Arts, 3.

A course of 12 lectures was given by Dr. Cates to 25 students of the College of Optometry, and 30 lectures to Third Year Honour Psychology students (13).

It is the feeling of the members of the staff of this Department that the second and third year medical students are required to cover too much ground in too many subjects in too short a time.

In Histology, Dr. Ham has endeavoured still further to lessen the burden, by issuing to the students mimeographed sheets on the work they are expected to cover. In Neurology Dr. Cates, with the assistance of Dr. Smith, has radically revised the course during the last two years; and the students are now provided with a mimeographed set of dissecting instructions which conform in general plan to the revised course. This has certainly led to an improvement in the students, understanding of the Anatomy of the central nervous system. In Anatomy Dr. Cates, in collaboration with the head of the Department, and with the assistance of Dr. George, prepared during the summer a detailed guide to the dissection of the human body conforming with the instruction given in this

school. This was issued to the students last session and was used by them with some success. In the light of our experience of its use during the session, we have revised the sheets and have made numerous changes and minor adjustments. This is being edited by Dr. George. In Embryology the term (final) examination paper is no longer a separate paper, but takes the form of one or more questions in the paper on Gross Anatomy.

Dr. J. C. Watt is engaged in translating and editing Volumes 2 and 3 of a new edition of Sobotta's Atlas of Human Anatomy.

Dr. Freda Richardson, as Richardson Research Fellow, has prepared and dissected for display in the museum an extensive series of vertebrate brains. These she is having suitably illustrated to demonstrate the salient and peculiar features. They will form a valuable addition to the teaching material of this Department.

Dr. F. P. Dewar and Dr. M. W. Hicks, who demonstrated in the Department of Physiology and in this Department last year, passed the primary examination of the Royal College of Surgeons of England. Of our undergraduates 000 passed the primary examination of the Royal College of Physicians and Surgeons of Canada.

It is much regretted that Dr. Melville C. Watson, who has demonstrated Anatomy in this Department for more than ten years, has felt compelled to resign in order to accept an appointment on the staff of the General Hospital.

Mr. H. E. LeMasurier, Senior Technical Assistant, has received a commission as Lieutenant in the 15th General Hospital, R.C.A.M.C. and has been appointed Quarter-master to this unit.

On the 9th of February of this year, the Department sustained a great loss in the sudden death of James Playfair McMurrich, Emeritus Professor of Anatomy. Although he was eighty years of age his interest in things never flagged; he was engaged in completing a history of Anatomy and he had just completed translating and editing Volume I of Sobotta's Anatomy. He came frequently to the Department—in which he retained a study—and there is no member of the staff who will not miss his genial personality.

Professor W. H. Piersol has completed the study of a very early and very rare human embryo in which only three pairs of somites have been developed. His report on this embryo is being published as one of the University of Toronto studies.

Dr. C. G. Smith has continued his investigation on the regeneration of sensory olfactory epithelium; his previous work on this subject was on the rat. This time it is on the frog. He finds that both the primary olfactory sensory neurons and the supporting elements regenerate.

Dr. R. K. George has made a study of the valves in the spermatic veins.

The Head of the Department has been engaged in preparing a second edition of his text-book and in collaboration with Dr. H. A. Cates, has written a companion to this book for use in the laboratory. In all of this he has had the assistance of Dr. R. K. George.

Mr. H. E. LeMasurier, in collaboration with Dr. Branion of the Poultry Department of the Ontario Agricultural College, has made the following three investigations on the nutrition and growth of the fowl up to six weeks of age and has reported on them: (1) A radiological study of the development of the fowl on a mineral deficient ration. (2) The relation of the mineral supplement consumption to the normal skeletal development as judged by X-ray examination of various breeds of fowl. (3) Some observations on the skeletal development of the fowl. In further collaboration with Dr. Branion he has made observations on unabsorbed yolk in chicks and on the place of oyster shell in the ration of the fowl.

Directed by Dr. A. W. Ham. Dr. K. Baldwin, working under a grant from the Banting Research Foundation, has studied the development of the lung. She has shown that near the end of foetal development the lining cells of the alveoli separate—instead of becoming stretched into a thin membrane as is commonly believed—and therefore that postnatal alveolar walls are not covered with epithelium.

Miss M. G. Chapman, also working under a grant from the Banting Research Foundation, has shown that rat endo-

metrium will grow in vitro with embryonic extract, and that oestrogens in cultures do not replace the growth stimulating effects of embryonic extract, even though they induce marked growth of this tissue in vivo. (This work is being carried out in an attempt to gain more fundamental information regarding normal and pathological cell growth.)

Miss Vera Ryder has, throughout the year obtained a considerable amount of human and animal specimens, with a view to determining how bones continue to grow in girth at the site of attachment of tendons.

Dr. Ham has performed further experiments related to the production of disease of the coronary artery, nephritis and periarthritis nodosa by upsetting the calcium and phosphorus metabolism. Through the courtesy of Dr. Best, the tissues of many animals shown to be diabetogenic, following the injection of pituitary extracts, were made available for histological study. This study is being performed by Dr. Ham of this Department and Dr. Haist of the Department of Physiology. It is yielding much information regarding the action of the extract on tissues as well as revealing the progressive histological changes that occur in the pancreas. Further work was carried out this year with Drs. Tisdall, Drake and Robertson of the Department of Paediatrics in connection with diet and the parathyroid glands. This and former work has established the fact that rickets is not necessarily associated with parathyroid hypertrophy; that the latter develops as a result of hypocalcaemia and that neither hypo- nor hyperphosphataemia causes parathyroid hypertrophy in the absence of hypocalcaemia.

Watt, J. C.: James Playfair McMurrich. *The Scientific Monthly*, April, 1939, Vol. XLVIII.

James Playfair McMurrich. *Science*, New Series, Vol. 89. No. 2310, April 7, 1939.

Watt, J. C., Jackson, C. M. and Craigie, E. H.: James Playfair McMurrich—in Memoriam. *Anatomical Record*, Vol. 74. No. 1. Supplement No. 1. May 25, 1939.

Ham, A. W.: The relation of the calcium and phosphorus metabolism to Dental Caries. *Oral Health*, May, 1939.

Smith, C. G.: The regeneration of sensory olfactory epithelium in the frog. *Anatomical Record*, Vol. 73, supplement 2, p. 47. (Abstract.)

LeMasurier, H. E. and Dr. Hugh Branion: The place of oyster shell in the ration of the fowl. (In Press.)

Some observations on unabsorbed yolk in chicks. (In Press.)

DEPARTMENT OF BIOCHEMISTRY

(Under the direction of Professor H. Wasteneys)

I have the honour to submit my report on the Department of Biochemistry for the year 1938-39.

The department and the Faculty suffered a great loss through the departure of Professor G. F. Marrian, who left last December to fill the Chair of Medical Chemistry at the University of Edinburgh. Professor Marrian was an inspiring lecturer and a brilliant and indefatigable research worker; his personality made him extremely popular with all his colleagues and his loss is severely felt in the department. Although he left in the middle of the term, he had completed the delivery of most of his lectures to the Arts students and the courses for which he was responsible did not suffer.

Junior members of the staff also left the department during the term. Dr. Gordon Butler was awarded an 1851 Research Scholarship and is now working under Professor Harington at University College. Dr. Odell left to accept a position in Montreal, as did Miss Dorothy Skill, who has been a laboratory assistant and research assistant in the department for the past nine years. Miss Skill was an exceptionally able worker and her departure is a severe loss.

Three of our graduate students received the Ph.D. degree at Commencement: Mrs. Anderson and Messrs. Schachter and Fishman. Dr. Fishman, a junior member of the staff, was awarded a Royal Society Fellowship and is leaving shortly to work under Professor Marrian at the University of Edinburgh. Mrs. Anderson was also, formerly, a member of the staff of the department.

The total number of students registered in the department during the session 1938-39 was 412. This number was made up of 225 Medical students, 23 students of the B. & M. course, 14 Chemistry, 6 P. & B., 1 B. & P., 5 Biology, 27 Household Economics, 21 Household Science, 10 General, 48 Dentistry, 1 Chemical Engineering and 31 Graduates. Of the graduate students 17 were candidates for the Ph.D. degree, 5 for the M.A. and 2 for the M.S.A. Ten were taking Biochemistry as a minor for degrees in other departments, and 7 were taking work as a major in Biochemistry.

With respect to the recent changes in the curriculum, the new course for B. & M. and Biology students continues to give satisfactory results, but the students from the Department of Chemistry who should properly take this course, owing to timetable difficulties, cannot do so and have taken the new course provided for Household Economics students. As mentioned in my last annual report, the changes in the curriculum for Medical students necessitated an extra course of lectures for Honour students in Household Economics. These lectures were given by Professor Wynne. The delivery of the 90 lectures which constitute the course has involved much extra time and work for Professor Wynne, but has proved advantageous to the students, since the absence of students from other courses has made it possible to adapt the lectures to the particular needs of the Household Science courses.

I cannot report yet with any confidence on the results of the division of the Biochemistry lectures for Medical students into two separate years. The results of the examination, held this year for the first time, at the end of the second year lectures, were not very encouraging, but another year's experience may show different results.

Mr. Crocker gave the extended course in Biochemistry for the Dental students. The examination results at the end of the course were not very satisfactory but, as with the second year course for Medical students, subsequent years may show adjustment to the change.

The staff of the department carried on researches throughout the session and during the summer vacation. These researches have been described in a separate report to the President.

Researches

Mr. B. F. Crocker and *Dr. Paul Hamilton* have been engaged in the elaboration of methods for determining with the necessary accuracy, small quantities of deuterium, which they propose to use for tracing the progress of ingested protein nitrogen in the animal body. They have succeeded in doing this and they have commenced the investigations rendered possible by this accomplishment.

Dr. H. B. Collier has continued his researches on the synthesis of proteins by papain and pepsin. He has obtained further proof of their synthetic activity and has studied some of the mechanisms involved in the synthesis as well as of the hydrolyses accomplished by these enzymes.

Directed by Professor Marrian:

Mr. E. A. Ryan has developed methods for the isolation of a compound of unknown constitution (compound X) from normal male urine and has determined some of its properties. He has isolated and identified three steroid compounds from this urine; the presence of two of these may help to elucidate steroid metabolism. He is now investigating a more exact method for the isolation of these compounds.

Dr. B. Schachter has succeeded in isolating a new crystalline conjugated compound from pregnant mares' urine. This compound he has shown to be none of the known conjugated oestrogens and he has spent considerable time in an attempt to determine its structure. He has ascertained, however, that the excretion of the new steroid conjugate in the urine of pregnant mares follows a course similar to that which he had previously determined for a known conjugated oestrogen.

Dr. W. H. Fishman has been engaged in studies of the action of the enzyme β-glucuronidase which he has obtained in the form of purified extracts of ox spleen. He has studied conditions for the action of this enzyme on various substrates. He has discovered that by feeding large doses of menthol and borneol to dogs and mice there is a definite increase in the β-glucuronidase activity in various tissues of these animals. Since the formation of glucuronides is a well known mechanism for the detoxication of poison from the body, this observation is of importance for the light it may throw on detoxicating mechanisms in general. He has also performed experiments which show that the formation of oestriol glucuronide is influenced by β-glucuronidase and that the site of this formation is the sex organs and not the liver.

Dr. A. D. Odell has been engaged in an attempt to study the metabolism and structure of pregnane triol. He obtained a good supply of this substance from the concentrate of the

neutral fraction of twenty-five thousand gallons of mares' urine.

Mrs. Edith B. Anderson has completed her investigation of the chemical constitution of equol, an optically active dihydroxyphenol isolated by Marrian and Haslewood in 1932 from the urine of pregnant mares. Mrs. Anderson has identified this compound as 7-hydroxy-3-(4′-hydroxyphenyl) chroman and has succeeded in synthesizing racemic equol methyl ether.

Dr. G. F. Marrian was engaged in the study of the optical activity of compounds he had prepared during his study of equol.

Directed by Professor A. M. Wynne:

Mr. M. Freed has continued his investigation, interrupted two years ago, of the synthesis of glycerides of oleic acid by pancreatic lipase. He has studied certain aspects of the kinetics of the synthetic process, particularly in relation to variations in the concentration of oleic acid and to the activating effects of bile salts.

Miss E. Macpherson has continued the investigation of methods of purifying pancreatic lipase for use in investigations into its synthetic action.

Mr. F. L. Root has been engaged in a study of the growth of *C. diphtheriae* in synthetic and other culture media, in relation to toxin production. His investigations have been greatly facilitated by the kind co-operation and helpful advice of Dr. E. M. Taylor and Dr. P. J. Moloney of the Connaught Laboratories.

Mr. J. Spizizen has been engaged in a study of the energy of activation of the invertase-sucrose system of yeast.

Mr. J. Tuba continued his investigation of factors affecting the formation and properties of yeast phosphatase.

Dr. A. M. Wynne, in co-operation with H. Z. Sable and J. P. Harshman, has recently undertaken an investigation of some of the factors influencing the formation and activity of phosphatase in the intestinal mucosa. It is hoped that the results of the investigation may help to explain the function

of the enzyme in its relation to the absorption of fatty acids and of sugars from the intestinal tract. This work is supported by a grant to Mr. Sable, made by the Banting Research Foundation.

Publications

Odell, A. D. and Marrian, G. F.: Some observations on the constitution of the "pregnanetriol" occurring in the urine of pregnant mares. *J. Biol. Chem.* Vol. 125, No. 1, Sept., 1938.

Marrian, G. F. and Butler, G. C.: Chemical Studies on the Adreno-Genital Syndrome. *Nature.* Vol. 142, p. 400, Aug. 27, 1938.

Marrian, G. F.: Some aspects of the intermediary metabolism of the steroid hormones. Harvey Lecture, Oct. 20, 1938. *Bull. New York Academy of Medicine*, 1939, Second Series. Vol. 15, No. 1. pp. 27-42.

Rabinowitch, L. and Wynne, A. M.: Studies on Pancreatic Lipase III. *J. Biol. Chem.* 126, 109, 1939.

Schachter, B. and Marrian, G. F.: The isolation of estrone sulfate from the urine of pregnant mares. *J. Biol. Chem.* Vol. 126, No. 2, Dec. 1938.

Anderson, E. L. and Marrian, G. F. The identification of equol as 7-hydroxy-3-(4′-hydroxyphenyl) chroman, and the synthesis of racemic equol methyl ether. *J. Biol. Chem.* Vol. 127, No. 3, March, 1939.

Fishman, W. H.: Studies on β-glucuronidase. I. A method of preparation and purification. *J. Biol. Chem.* Vol. 125, No. 2, Feb., 1939.

DEPARTMENT OF HISTORY OF MEDICINE

(Under the direction of Professor Jabez H. Elliott)

The course of lectures laid down in the curriculum was given, with gratifying evidence of interest on the part of the classes. Further additions have been made to the collection of lantern slides to illustrate the lectures. Leave of absence was granted to attend the XI International Congress of History of Medicine held in Jugoslavia, September 1-14, 1938. Your representative was elected to represent Canada on the Permanent Committee of the International Association of History of Medicine at its meeting in Sarajevo on September 10th. A report of the Congress has been made to the President of the University, who has placed it in the Library. On January 2nd I addressed the Academy of Medicine, Toronto, on the Congress held in Jugoslavia. On April 28th I was guest speaker at the inaugural meeting of the Section of Historical Medicine of the London Academy of Medicine. On May 1st, 1939 I attended the annual meeting of the American Association of History of Medicine at Atlantic City,

contributed to the programme and was honoured by being elected Vice-president with Dr. Esmond R. Long as President.

The Exhibit on the History of Tuberculosis, prepared with Dr. W. S. Stanbury, was requested for the annual meeting of the Ontario Medical Association at Hamilton, June, 1939, and received favourable comment. One short article has been published, "The Medical Faculty of the University of Toronto, its Early History and Development".

DEPARTMENT OF HYGIENE AND PREVENTIVE MEDICINE

(*Under the direction of Professor J. G. FitzGerald*)

The enrolment of graduate students in the course for the Diploma in Public Health for the session 1938-39 numbered seventeen as compared with eighteen last year. The following provinces were represented: Prince Edward Island, New Brunswick, Quebec, Manitoba, Ontario. The registration included one candidate from Alaska. Fifteen students were on fellowship, of whom eight were Rockefeller Foundation fellows and three Connaught Laboratories fellows. Including the students of this year, the total number enrolled since 1911 is 181.

As previously, courses of instruction in bacteriology, immunology and medical protozoology were given to these students in the course leading to the Diploma in Public Health and also to suitably qualified graduate students. Two graduates in engineering proceeding to the degree of M.A.Sc., took laboratory courses in this department. This is the first year that students specializing in public health engineering have been given instruction.

The tutorial method of instruction, adopted three years ago, to students in the fifth year in medicine has proved satisfactory. To this end the class of 133 students was divided into six groups with the following, each in charge of one group: Dr. M. H. Brown, Dr. Frieda Fraser, Dr. Donald Fraser, Dr. Ronald Hare, Dr. D. L. MacLean, Dr. R. D. Defries. The general emphasis in this presentation is laid upon the means by which the general practitioner may most effectively practise preventive medicine. Instruction is de-

signed to familiarize the student with current literature and practice. The students are required to contribute to the seminar the results of their reading of original articles upon allotted subjects. The students are thus encouraged to take an active part in the discussion groups.

The field course for fifth year students was, as in the past, held in the spring and fall. The opportunity for the students to obtain an insight, at first hand, into the functions and practices of provincial and municipal departments of health is made possible by the continued co-operation and assistance, both in time and personnel, of the Department of Public Health, Toronto, and the Department of Health, Ontario.

Laboratory courses in microbiology were given to students in the second year of the College of Pharmacy and to students in second year Household Science and Household Economics. It is a pleasure to report the interest shown by these students in the courses offered. Students in third year Household Science and Household Economics received a lecture course in preventive medicine. Lecture and laboratory courses were also given to students in the School of Nursing.

The enrolment for the session has been as follows:

Graduate students (17 Candidates for the Diploma in Public Health)	21
Faculty of Medicine, Fifth Year	133
Faculty of Household Science, Second and Third Years	26
Faculty of Arts, Second and Third Years	72
College of Pharmacy, Second Year	118
School of Nursing	68

Mr. R. J. Wilson has again held the appointment of fellow in this department. He has continued his studies in staphylococcus. In co-operation with Dr. James Roberts, Hamilton, laboratory studies were carried out in connection with epidemics of staphylococcus food poisoning. These studies showed the relation of carriers to the epidemics. Dr. M. F. McGavin has assisted Dr. Donald Fraser in research in the field of diphtheria immunity. Dr. F. O. Wishart is pursuing research on dysentery.

Dr. Ella Kuitunen, who is working under a grant from the Banting Foundation, has conducted a comprehensive survey of intestinal parasites of children with the kind co-operation of Dr. Alan Brown. The incidence of enterobiasis was sur-

prisingly high, namely, approximately 50 per cent. A survey of the incidence of trichinosis in adults and chilrden is in progress with the co-operation of Dr. I. H. Erb and Dr. G. L. Cuff. The infection has been found in a new-born child and in two adults. Approximately one hundred diaphragms have been examined by the direct and by the Baermann digestion methods.

Research studies have been actively carried on by members of the department who are also members of the staff of the Connaught Laboratories. A comprehensive report of these will be found in the report of the Director of the Connaught Laboratories.

DEPARTMENT OF MEDICAL JURISPRUDENCE

(Under the direction of Dr. K. G. Gray and Professor W. L. Robinson)

The lectures in medical jurisprudence and toxicology are given by Professor W. L. Robinson, Professor V. E. Henderson, and myself. The lectures are limited to the students in the fifth year and there is only one examination paper for the whole course.

My part of this course of lectures consists of about ten hours each year. These lectures are designed to acquaint the student with legal matters affecting the practice of medicine. Some of the topics are:—

The licensing of professional bodies; constitution of courts, both criminal and civil; giving evidence; the expert witness; mental incompetency; certification of the mentally incompetent person; establishment of public and private hospitals and sanatoria; liability of doctors and hospitals for negligence; consent for operation; consent for post-mortem examination; public health administration in Canada.

DEPARTMENT OF MEDICINE

(Under the direction of Professor Duncan Graham)

Clinical Instruction. No essential changes have been made in the general plan of undergraduate instruction in Medicine. Regular meetings were held during the year to review again

the subject matter and the methods of instruction in the course on Physical Examination and Clinical History Taking.

In September last, a postgraduate course on "Metabolic and Endocrine Diseases" was given by the staff of the department.

Last summer Dr. Farquharson took part in the Summer Postgraduate Course given in Vancouver.

Staff. The department records with deep regret the death in March last of one of its senior members, Dr. A. J. Mackenzie, Senior Demonstrator in Medicine and Attending Physician to St. Michael's Hospital.

The department regrets to announce the retirement from the staff of two Associates in Medicine, Dr. H. C. Parsons and Dr. A. G. McPhedran. Since the establishment of special tuberculosis clinics in the hospitals of Toronto, Dr. Parsons has been the Physician-in-Charge of these clinics at the Toronto General Hospital and the Hospital for Sick Children, and for the past twenty years has supervised the clinical instruction given to undergraduates attending these clinics.

For the past twenty years Dr. A. G. McPhedran has been responsible for the lectures and demonstrations on methods of physical examination. During the same period he has been an Attending Physician, first on the wards and later in the Out-Patient Department of the Toronto General Hospital. The department takes this opportunity of expressing its thanks to Dr. Parsons and Dr. McPhedran for their valuable services. The best wishes of their colleagues in the department follow them in their retirement.

After six years' postgraduate work, two of which were spent in London as House Physician at Queen's Square Hospital for Nervous Diseases, Dr. J. C. Richardson has joined the staff of the department. He will devote special attention to the study of diseases of the nervous system.

During the past year Dr. R. C. Dickson has been a Fellow in Medicine and Resident Physician of the Toronto General Hospital. The Alexander McPhedran Research Fellow in Clinical Medicine was Dr. J. L. A. Fowler.

Dr. Trevor Owen, a Member of the Royal College of Physicians of London since 1926, has been honoured by elec-

tion to Fellowship in the college. In June, the head of the department was elected President-elect of the Canadian Medical Association.

Clinical Investigation. Satisfactory progress has been made in the investigation of a number of clinical problems. Dr. Cleghorn, in association with Dr. J. L. A. Fowler, Alexander McPhedran Research Fellow, and Mr. J. S. Wenzel, has continued his investigations on adrenal glands. The first report of their work on the adrenal cortex in relationship to the functions of the sympathetic nervous system is now in press. Through the courtesy of the Ciba Company of Basle, it has been possible to test the synthetic adrenal cortical hormone, desoxycorticosterone, in the treatment of patients with Addison's disease, to study its effects on adrenalectomized animals and to compare the results with those obtained by the use of cortical extract. To date nine patients have been treated effectively with the synthetic hormone. All have shown a marked improvement in their sense of well-being and in increase of blood pressure and serum sodium. Appetites improved and added salt in the diet was well tolerated. As four of these patients had been under treatment with cortical extract for periods of one to four years, an attempt was made to determine the equivalent maintenance dosage of synthetic hormone. It would appear that 1.0 c.c. or 5 mgm. of the synthetic hormone is of equal, or greater, potency than 5 c.c. of the cortical extract used in the earlier treatment of these patients. Whether this synthetic hormone replaces completely the deficiency in function of the adrenal cortex caused by disease can only be determined by more prolonged observation. The claim has been made by Verzer that iodoacetic acid acts on the same chemical mechanism in the body as that controlled by the adrenal cortical hormone. In the course of an investigation to test this hypothesis, it has been found that iodoacetic acid produces a profound anaemia in dogs. This work is being continued.

A major problem for those using high voltage X-ray therapy in the treatment of cancer has been the treatment of radiation sickness which may develop in patients receiving this form of therapy. A year ago Spies reported favourable effects from nicotinic acid in the treatment of radiation sick-

ness. With the consent of Dr. Richards, Dr. J. W. Graham undertook an investigation of the cause of radiation sickness and studied the effect of nicotinic acid in its treatment. Dr. Graham has found that approximately 27 per cent of patients receiving high voltage X-ray treatment develop troublesome nausea and vomiting and that in 70 cases of nausea and vomiting the administration of nicotinic acid resulted in relief of these symptoms in 75 per cent. He found, too, that the drug was easily taken and had no after effect. A full report of this work will be published soon.

In association with Dr. Harold Box, of the Faculty of Dentistry, Dr. J. W. Graham has undertaken a study of disturbances in oral secretion and their possible relation to dental disease. Definite progress is being made.

The effect of certain gold salts in the treatment of rheumatoid arthritis is being studied by Dr. Fletcher and Dr. J. W. Graham.

Dr. Farquharson and Dr. Hyland have published a report on eight cases of anorexia nervosa in which they discuss the nature of the disorder, its clinical manifestations and the treatment of the condition. In this important and timely contribution they have presented evidence to show that this syndrome, first described by Gull, is a metabolic disturbance of psychological origin and not a primary deficiency or dysfunction of an endocrine gland. Effective treatment is dependent upon the recognition of the nature of the disorder.

Dr. Hyland, working in co-operation with the Department of Medical Research, has continued his study on the electroencephalographic changes occurring in patients suffering from migrain and epilepsy. By this method of investigation it has been found that, in patients suffering from epilepsy, definite disturbances occur in the brain prior to the onset of an epileptic seizure. A preliminary report of this work is now in press.

In the past year, Dr. Gordon Bates and his Committee on Artificial Respiration of the Health League of Canada have published a valuable report on the benefits of prolonged artificial respiration in the treatment of cases of drowning, asphyxiation and electric shock. The interest aroused by

the publication of this and other reports on the same problem should result in the saving of many lives from drowning.

One of the most important advances in medicine in the past year was the discovery of a new chemical compound called "M. & B. 693," "Dagenan" or "Sulphapyridine," which was found by Whitby to be effective in the treatment of experimental pneumococcal infections in mice and by Evans and Gaisford in the treatment of pneumococcal pneumonia in man. Through the courtesy of Messrs. May and Baker, we received a supply of this new drug for clinical trial and were the first in Canada to use this drug in the treatment of pneumonia. Evans and Gaisford reported a mortality rate in pneumococcal pneumonia of 8 per cent in their M. & B. 693 treated group of cases as compared with 27 per cent in cases receiving non-specific treatment. We have been able to confirm their findings and show that the drug is effective for all types of pneumococcal pneumonia. The results in the treatment of fifty cases of pneumococcal pneumonia have been published.

Publications. A year ago Dr. E. E. Cleaver was requested to contribute the section on "Stomach, Tumours and Some Other Conditions" in the British Encyclopaedia of Medical Practice. The section was written and has just been published.

A list of publications is appended.

Bates, G.: The need for prolonged artificial respiration in drowning, asphyxiation and electric shock. *Canad. Med. Assn. Jour.*, 1938, XXXIX, 120. (With Gaby, R. E. and Maclachlan, W.)

Artificial respiration. *Bull. Acad. Med.*, Toronto, 1938, XI, 288.

"Diphtheria-Toxoid Week" in Toronto. *Canad. Pub. Health Jour.*, Dec., 1938.

The nutritive and safety value of pasteurized milk. Publication of The Health League of Canada, 1938.

Results of Venereal Disease control in Canada. *Amer. Jour. Pub. Health*, 1939, XXIX, 143.

Brooks, E. F.: The successful excision of a tumour of the pineal gland. *Canad. Med. Assn. Jour.*, 1938, XXXIX, 240. (With D. W. Pratt.)

Broughton, E. A.: Treatment of lobar pneumonia with antipneumococcus rabbit serum. *Bull. Acad. Med.*, Toronto, 1939, XII, 161.

Brown, W. Hurst: Use of sulfanilamide in clinical medicine. *Canad. Med. Assn. Jour.*, 1938, XXXIX, 15.

Campbell, W. R.: The management of acute and chronic nephritis. *Bull. Acad. Med.*, Toronto, 1938, XI, 226.

Iodine in normal nutrition. *Canad. Med. Assn. Jour.*, 1939, XL, 77.

Cleaver, E. E.: Stomach, Tumours and Some Other Conditions. *The British Encyclopaedia of Medical Practice*, Vol. XI, 476. London, Butterworth & Co., 1939.

Cleghorn, R. A.: Adrenal cortex: experimental studies and their clinical application. *Bull. Acad. Med.*, Toronto, 1938, XI, 255.
Cardiac lesions in adrenal insufficiency. *Canad. Med. Assn. Jour.*, 1938, XXXIX, 126.
Addison's disease with associated myxoedema. *Proc. Amer. Soc. Clin. Invest., Jour. Clin. Invest.*, 1938, XVII, 526.
Dauphinee, J. A.: The iron requirement in normal nutrition. *Canad. Med. Assn. Jour.*, 1938, XXXIX, 483.
Detweiler, H. K.: Dyspnoea, its significance and treatment. *Bull. Acad. Med.*, Toronto, 1938, XI, 262.
Treatment of pneumonia. *Bull. Acad. Med.*, Toronto, 1938, XI, 282.
Some notes on allergy. *Univ. Toronto Med. Jour.*, 1938, XV, 228.
Dixon, H. A.: Melanotic sarcoma with extreme melanosis: report of a case. *Arch. Dermat. & Syphil.*, 1938, XXXVIII, 574.
Skin diseases in children. *Canad. Med. Assn. Jour.*, 1938, XXXIX, 261.
Farquharson, R. F.: Calcium requirements of the normal individual. *Canad. Med. Assn. Jour.*, 1938, XXXIX, 280.
Anorexia nervosa: a metabolic disorder of psychological origin. *Jour. Amer. Med. Assn.*, 1938, CXI, 1085. (With H. H. Hyland.)
Simmonds' disease: clinical and pathological observations on four cases. *Trans. Amer. Clin. and Climatol. Assn.*, 1938, LIV, 106. (With T. H. Belt and G. L. Duff.)
The anaemias. *Supp. to the Bull. Vancouver Med. Assn.*, Feb., 1939, p. 5.
Diseases of the liver. *Ibid.*, p. 50.
Leukaemia. *Ibid.*, p. 66.
Enlargement of the lymph glands. *Ibid.*, p. 38.
Graham, Duncan: Observations on the treatment of respiratory paralysis in adult poliomyelitis. *Trans. Assn. Amer. Physicians*, 1938, LIII, 165. (With H. H. Hyland.)
The treatment of pneumococcal pneumonia with dagenan (M. & B. 693). *Canad. Med. Assn. Jour.*, 1939, XL, 325. (With W. P. Warner, J. A. Dauphinee and R. C. Dickson.)
Graham, J. W.: The vitamins. *Univ. Toronto Med. Jour.*, 1938, XVI, 13 and 70.
Disturbances in oral secretions and their relation to dental caries. *Oral Health*, 1939, XXIX, 354.
Hyland, H. H.: Acute anterior poliomyelitis. (A review of 66 adult cases which occurred in the 1937 Ontario epidemic.) *Canad. Med. Assn. Jour.*, 1938, XXXIX, 1 and 105. (With W. J. Gardiner, F. C. Heal, W. A. Oille and O. M. Solandt.)
Cerebral angioma arteriale: a case in which migrainous headache was the earliest manifestation. *Arch. Neurol. and Psychiat.*, 1938, XL, 1220. (With R. P. Douglas.)
Lougheed, G. W.: Pulmonary embolism: origin and types. *Bull. Acad. Med.*, Toronto, 1939, XII, 89.
McPhedran, J. H.: Three cases of diabetes insipidus, one associated with toxic goitre. *Canad. Med. Assn. Jour.*, 1938, XXXIX, 370.
Richardson, J. C.: Intracranial aneurysms. *Univ. Toronto Med. Jour.*, 1938, XV, 304.
Warner, W. P.: Subphrenic abscess. *Surgery*, 1938, IV, 405. (With W. A. Doidge.)
The relief of dyspnoea in pulmonary emphysema by a costal margin belt, with an attempt to measure the degree of disability in emphysema by determining the total lung volume. *Trans. Amer. Clin. and Climatol. Assn.*, 1938, LIV.
Antipneumococcus rabbit serum in the treatment of pneumonia. *Canad. Public Health Jour.*, Feb., 1939, p. 82.

DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY

(*Under the direction of Professor William A. Scott*)

I have the honour to present the following report of the work of the Department of Obstetrics and Gynaecology for the academic year, 1938-1939.

The changes in the curriculum in this department appear to be working very satisfactorily. During the past year the practical training in the Fifth Year was extended from a period of two weeks to one of five weeks, and we believe there is evidence of the great value of this increased amount of practical training. The didactic lectures of the Fourth Year have been more condensed so that a greater amount of ground is covered, preparing the student more thoroughly for the beginning of their practical work in the Fifth Year.

A new system of examinations, namely, a comprehensive examination of theoretical knowledge in the Fifth Year, and a clinical type of examination, practical in nature, in the Sixth Year, is yielding valuable results to the teaching staff which should be reflected in the instructions that the students obtain.

The summer course for a limited number of students who have completed their Fifth Year is still continued, and we believe it offers great advantages to the student taking it, as well as reducing the number of students to be instructed during the academic year. In the fall of 1939 a further innovation is to be started whereby a limited number of students who have completed their Fourth Year will return five weeks before the beginning of the session and will have completed the practical work of the Fifth Year before the school opens. This will lessen the number of students for whom hospital accommodation must be made in the Fifth Year.

Dr. Nelson Henderson collaborates with the Department of Pathology in the routine work of Gynaecological Pathology, and has also carried out some interesting investigations on special subjects

Dr. W. G. Cosbie and Dr. J. R. McArthur collaborate with Dr. G. E. Richards in the radiological treatment of gynaeco-

logical carcinoma, which is becoming a much larger division of the gynaecological work.

Dr. M. C. Watson continues to direct the work in Endocrinology, and it is hoped that shortly a study of pregnandiol estimations will be undertaken.

A study of the cases of antenatal haemorrhage in the Obstetrical Department was made last year, the results of which will be published shortly.

DEPARTMENT OF OPHTHALMOLOGY

(*Under the direction of Professor William H. Lowry*)

I beg to report upon the work of the Department of Ophthalmology for the past session. The graduating class was, in my opinion, rather better than the average as evidenced by their attention to clinics and lectures and by the results of their examinations. They appear to have had a practical knowledge of eye work which will help them in practice or in internship.

The staff have been faithful in their duties and have shown enthusiasm in their teaching. Dr. MacDonald has prepared and read four papers: "The Internist and Ophthalmoscope" and "Eye Wash" (Collyrium), published in the Journal of the Canadian Medical Association; also "Six Cases of Lindau's Disease, Four Improved and Living," and "Recent Advances in the Care of the Insensitive Cornea."

The Department of Pathology has given its usual assistance and facilitated our work greatly. The laboratory has sectioned and reported upon about one hundred specimens and have added to our collection of valuable pathological specimens and sections.

DEPARTMENT OF OTO-LARYNGOLOGY

(*Under the direction of Professor P. G. Goldsmith*)

In my last report I referred to the work of the special committee on the curriculum. The suggested changes I advocated were given very sympathetic consideration, but it was not found feasible to adopt them this year. I feel sure,

however, that a way will yet be found to adopt the recommendations made.

Oto-laryngology has not always been a compulsory subject in medical school examinations. Owing to the general progress of medical science and the importance of the refinements of medical and surgical investigations, added significance has been given to diseases of the ears, nose and throat. In the Departments of Medicine and Surgery, there is a tendency for more intensive study and more teaching of the problems in which these special organs are concerned. Although the complete study of the patient often necessitates assistance from the specialty departments, there is always the danger of the men in these departments being more concerned with the symptoms and complaints of the restricted field than with their relation to the condition of the patient as a whole. The special departments are in charge of men who have had post-graduate training in their respective fields. The success of these "specialists" both in teaching undergraduates and in attending to the clinical practice of the hospital, depends very largely on the thoroughness of their training in Medicine, Surgery and Pathology.

The Department of Oto-laryngology is singularly well situated in this regard. The staff has had a very thorough training and is very efficient. In recent years they have shown their interest in progress by attending specialists' conventions and by reading the new literature on the subject. I should say that the staff is soundly conservative, familiar with the new but untried methods of treatment, but not accepting them unless convinced by their own experience and that of sound men elsewhere, that they are best for the patient.

The object of the Faculty of Medicine of the University is to provide the public with safe, efficient doctors.

The Department of Oto-laryngology, in order to take its place in securing for the public their rights and expectations, teach the medical student how to examine these special regions and recognize the common diseases. In no way is it expected to make the student even a poor specialist. In the Fifth Year small groups of students have their knowledge of special anatomy reviewed, and are practised in using the ordinary instruments required in examining the ears, nose and throat.

The next or final year is devoted to the study of diseased conditions. Here, instruction is by ten didactic lectures and clinics held in the Out-Patient Department, on the common ailments occurring in general practice. The didactic lectures, while too few in number, are made very practical. In these lectures every effort is made to make the students familiar with the importance of accurate history taking, and the significance of leading symptoms. The subjects taught come under such headings as epistaxis, nasal discharge, sore throat, hoarseness, complications in aural suppuration, pain and swelling about the ear, deafness, vertigo, and tinnitus.

When the relative importance of the subject of Oto-laryngology is considered, I am satisfied that the size of the staff is too unwieldy. Their division into groups of three or four results in each group having only three months' active work during the year. However, they do attend out-patient clinics twice weekly for two and one-half hours, the senior members of each group spending one hour twice a week teaching a small class of students at the Toronto General, St. Michael's and the Children's hospitals respectively.

I am satisfied that a change is desirable from the standpoint of both the ward and out-patient work. The number of the members of the staff might be drastically reduced and the work of each would be correspondingly increased. Another method with commendable features would be to divide the staff into two sections, one carrying out ward work and university teaching, while the other would restrict its activities to the care of patients in the out-patient clinics. The teaching of students could be accomplished under either of these methods as the number of demonstrations on methods of examining patients might be fewer and the students taken in larger groups.

In the oral examinations at the end of the final year, the student must show his capability of using examining instruments intelligently; he must satisfy the examiner that he is able to recognize the simple common ailments met in general practice; and he must be sufficiently familiar with ordinary complications and their dangers to give his patients advice as to the best course to pursue. No attempt is made to test his knowledge of minute details of anatomy or pathology.

There is a general tendency in the best medical schools to lessen the importance of the specialists and to restrict the time devoted to them in teaching hours. There can be little argument against this viewpoint. In our undergraduate teaching we have this ever in mind, and try to arrange our instruction so as to make the student a better all-round physician rather than a poor surgical specialist. Owing to the present large number of instructors in the department, difficulty in securing uniformity in teaching and systematic instruction is encountered.

Undergraduate teaching is carried on in the Toronto General Hospital and the Hospital for Sick Children, unusually excellent facilities being available in both of them. This year, a small group of students were assigned to St. Michael's Hospital, where the teaching was carried out by two senior demonstrators. Owing to the small classes and the distance away from the other hospitals, this arrangement was unsatisfactory and some change is considered advisable.

During the past year Doctors Ireland, McGregor and the head of the department acted as examiners on the American Board of Oto-laryngology and took part in the instructional course given by the American Academy of Oto-laryngology and Ophthalmology. Dr. Staunton Wishart presented a valuable paper at the American Otological Association. Dr. Joseph Sullivan has continued his efforts to assess the value of operative aural surgery in chronic obstructive deafness, and took part in a symposium on this subject at the American Laryngological, Rhinological and Otological Society.

Publications

"The Comparative Anatomy of the Tongue". By Dr. Gregor McGregor. Published in the Annals of *Otology, Rhinology*, and *Laryngology*.

"The Bronchoscopic Aspects of Carcinoma of the Lung." Part of a Symposium on Carcinoma of the Lung. Presented at the Academy of Medicine, Toronto. By Dr. Gregor McGregor.

"Some Observations on Petrous Tip Suppuration." By Dr. D. E. S. Wishart. Published in *Canadian Medical Association Journal*, July, 1938.

"Discussion of Paper by Dr. Walter Hughson on Grafts in the Round Window." Published in *Laryngoscope*, Aug., 1938. By Dr. D. E. S. Wishart.

"Vertigo." A Chapter on, in Vol. 11, *The Practitioner's Library of Medicine and Surgery*. D. Appleton Century Co. Chapter 28, pages 631-644. By Dr. D. E. S. Wishart.

"The Endaural Route." American Otological Society, Inc., 1939. (To be published in *Laryngoscope.*) By Dr. D. E. S. Wishart.

"Routine Hearing Tests." Canadian Medical Association Meeting, 1939. (To be published in *Canadian Medical Association Journal.*) By Dr. D. E. S. Wishart.

"Resume of Literature on Rhinology in Children for 1938. Published in *Laryngoscope*, 1939. By Dr. D. E. S. Wishart.

"Focal Infection in Nose and Throat." Canadian Medical Association Meeting, 1939. (To be published in *Canadian Medical Association Journal.*) By Dr. Howard McCart.

"Facial Paralysis Complicating Mastoid Operation." Published in the *Canadian Medical Association Journal*, 39, 451-454, 1938. By Dr. J. Sullivan.

"The Common Head Cold." Published in the Wayne County Medical Society proceedings, Nov., 1938. By Dr. J. Sullivan.

"The Treatment of Facial Paralysis." Read before the Detroit Oto-Laryngological Society, March, 1939. Published in their proceedings. By Dr. J. Sullivan.

"The Care of Mastoid Wounds." Discussed before the American Triological Society, Chicago, 1939. Published in their proceedings. By Dr. J. Sullivan.

"Facial Spasm." Read before the Oto-Laryngological Section of the American Medical Association, St. Louis, May, 1939. Published in the *American Medical Journal.* By Dr. J. Sullivan.

"A Clinical Lecture on Hoarseness. Illustrated by Coloured Lantern Slides. Presented at the Canadian Medical Association Meeting in Halifax, 1938. By P. G. Goldsmith.

"Lesions of the Upper Respiratory Tract Associated with Sore Throat and Hoarseness." Illustrated with Coloured Lantern Slides. Presented before the Ear, Nose, and Throat Department of the Syracuse Academy of Medicine, Syracuse, March, 1939. By Dr. P. G. Goldsmith.

"The Diagnosis and Treatment of Accessory Sinus Disease." An Instructional Course given at the Canadian Medical Association Meeting, in Montreal, June, 1939. By Dr. P. G. Goldsmith.

"Upper Dysphagia." Published in the *American Journal of Roentgenology*, August, 1939. By Dr. A. H. Veitch, in corroboration with Dr. E. H. Shannon.

"Surgical Emergencies in Oto-Laryngology." Presented at the American Academy of Oto-Laryngology, in Washington, 1938. By Dr. P. E. Ireland.

DEPARTMENT OF PAEDIATRICS

(Under the direction of Professor Alan Brown)

The staff of the Department of Paediatrics, University of Toronto, has been actively engaged in studies on the prevention and cure of the diseased conditions encountered during infancy and childhood. The cure of disease is naturally much more spectacular than the prevention, yet today everyone recognizes that of the two, prevention is the more important. Accordingly, a great deal of the activity of the department is directed towards the prevention of disease.

With the exception of diseases such as syphilis and malaria, no chemical means has been found for combating disease until about two years ago. At that time it was discovered that the chemical substance sulphanilamide had a striking effect in the treatment of patients infected with streptococcus, meningococcus and gonococcus. The value of this chemical has been strikingly shown in this department in the treatment of streptococcic meningitis, which formerly was fatal in one hundred per cent of the cases, while at the present time fifty to sixty per cent of the patients are recovering. Excellent results have also been obtained in the treatment of erysipelas and streptococcic infections of the throat. We have also attempted to evaluate the effect of sulfapyridine in the treatment of pneumococcal infections. No deaths have occurred in cases of uncomplicated lobar pneumonia in children over 2 years of age treated with sulfapyridine. However, our mortality in this age group treated without either sulfapyridine or serum has been only two or three per cent, so it is hard to draw conclusions. Of value in demonstrating the antipneumococcal effect of sulfapyridine has been the recovery through the use of sulfapyridine of two out of five cases of pneumococcic meningitis, a disease in which over the previous ten years the mortality had been one hundred per cent.

In co-operation with the Banting Department of Medical Research, the use of electro-encephalography has been investigated in children presenting behaviour problems or suffering from convulsive disorders. Encephalograms have proven of definite value in distinguishing between convulsions and functional attacks. The value of Dilantin in the treatment of epilepsy has been studied with the finding that this drug, while of value in controlling *grand mal* attacks, is of little value in *petit mal.* The sequelae of birth injuries have been investigated, with the finding that a great number of these infants have permanent injuries in the nature of paralysis, convulsions or mental retardation.

Valuable information has been obtained on the requirements of vitamin C during pregnancy and early childhood. During the course of these studies it was necessary to develop an accurate method for the determination of vitamin C. Fortunately this has been accomplished and results obtained

which indicate that during the period of pregnancy the mother requires large amounts of vitamin C. In regard to the nursing infant, it was found that it was essential for the mother to secure a proper amount, otherwise the amount present in the milk, and consequently in the infant's body, was below the optimal level. Vitamin C should be administered to the infant within the first month of life. Formerly it was not considered necessary until the infant was four or five months of age. In the past, attempts have been made by various observers to use single estimations of the vitamin C content of the blood as a means of diagnosing acute and latent scurvy. We have found that single estimations of vitamin C in the blood are not a measure of the state of the vitamin C metabolism of the body as whole. No measurable amounts of vitamin C have been found in the blood in such widely varying conditions as advancing scurvy, healing scurvy and infants showing no clinical evidence at all of scurvy. We are now working on vitamin C tolerance tests in infancy and childhood, which we hope will be valuable.

In co-operation with the Department of Obstetrics, Univeristy of Toronto, the Dietetic Department of the Toronto General Hospital, and the Visiting Homemakers' Association, studies are being made on the effect of diet on the pregnant woman, the infant, and the woman's milk. This work includes the keeping of individual records of food consumption, the estimation of haemoglobin, vitamin C, and phosphatase in the mother's blood, before and after delivery, chemical and vitamin measurements on the infant's blood, and vitamin measurements on the mother's milk. The dietary survey has shown that a considerable number of prenatal patients are lacking in some of the essential food substances. The chemical studies on the blood of the mother and of the child, and the mother's milk reflect these deficiencies. The deficiencies can be remedied in some cases by education concerning the diet and in other cases by supplementing the food supply.

In conjunction with the Engineering Department of the Canadian General Electric Company and the General Electric Company of Schenectady, studies are being conducted on air-contamination and air-sterilization. One of the important problems to be solved in connection with the care of patients

in hospitals is the prevention of air-borne infection; that is, infection carried by the air from one patient to another. It has been found that the use of ultraviolet light will kill from 92 to 98 per cent of bacteria artificially introduced into an experimental cubicle. Barriers of ultraviolet light are very effective in preventing the spread of artificially introduced bacteria from cubicle to cubicle in an experimental room, even though 50 per cent of the air in the room is being recirculated.

The biological estimation of vitamins entails the expenditure of a great deal of time and much expense in comparison with chemical methods. Our laboratories are devoting a good deal of time to the perfecting of these chemical methods and their adaptation to vitamin measurements in the well and ailing child, and in Canadian foods.

Studies are being continued on heart disease, diabetes, nephritis, and other nutritional and infectious diseases in infancy and childhood.

During the past year the workers in this department have taken an active part in disseminating the wealth of information which has been obtained in recent years on the importance of proper nutrition to health. The benefits of proven scientific knowledge on this subject cannot be obtained unless active steps are taken to have it used in a practical manner by the nation.

Publications

Determination of Iron in Biological Material, S. H. Jackson, *Industrial and Engineering Chemistry*, Analytical Edition, Vol. 10, p. 302, June 15, 1938.

Nutritional anaemia—prevention and cure, Charles E. Snelling, *Academy of Medicine Bulletin*, p. 7, October, 1938.

Nutrition and its effect on health, E. Chant Robertson, *Canadian Hospital*, Vol. 15, No. 6, June, 1938.

Vitamins in infancy and childhood, F. F. Tisdall, *Can. Med. Assoc. Jour.*, Vol. 39, p. 179, July, 1938.

Persistent anosmia following zinc sulfate nasal spraying, F. F. Tisdall, Alan Brown and R. D. Defries, *Jour. Ped.*, Vol. 13, p. 60, July, 1938.

Nutrition, F. F. Tisdall, *Health*, Vol. 6, No. 2, 1938.

Mental hygiene in an orthopaedic hospital, J. D. M. Griffin, Wm. A. Hawke and W. Wray Barraclough, *Jour. of Ped.*, Vol. 13, p. 75, July, 1938.

Some factors concerning the care of the new-born, Alan Brown, *Can. Pub. Health Journal*, p. 337, July, 1938.

Antique English Delft Pottery, T. G. H. Drake, *Can. Med. Assoc. Jour.*, Vol. 39, p. 585, 1938.

Introduction of Solid Foods into the Diets of Children, T. G. H. Drake, *Can. Med. Assoc. Jour.*, Vol. 39, p. 578, 1938.

The Nursing Bottle's Family Tree, T. G. H. Drake, *Health*, Vol. 6, No. 4, 1938.

Myotonia Congenita, Wm. A. Hawke, *Jour. Ped.*, Vol. 13, p. 236, August, 1938.

The Biophotometer as a test for vitamin A deficiency, C. E. Snelling, *Jour. Ped.*, Vol. 13, p. 506, October, 1938.

An unusual case of speech defect, Ruth Lewis, *Speech*, Oct., 1938.

Value of an increased supply of vitamin B1 and iron in the diet of chlldren, Paper III, Pearl Summerfeldt and John R. Ross, *Amer. Jour. Dis. Child.*, Vol. 56, p. 985, November, 1938.

Nicotinic acid in the treatment of acrodynia, F. F. Tisdall, T. G. H. Drake and Alan Brown, *Jour. of Ped.*, Vol. 13, p. 891, December, 1938.

Utilization of Calcium, F. F. Tisdall and T. G. H. Drake, *Jour. of Nutrition*, Vol. 16, p. 613, December, 1938.

Osteodystrophia Fibrosa, Pearl Summerfeldt and Alan Brown, *Amer. Jour. Dis. Child.*, Vol. 57, p. 90, January, 1939.

Treatment of urinary infections in children with sulfanilamide, Pearl Summerfeldt and D. R. Mitchell, *Jour. Urology*, Vol. 41, p. 59, January, 1939.

Nutrition and resistance to disease, E. Chant Robertson and F. F. Tisdall, *Can. Med. Assoc. Jour.*, Vol. 40, p. 282, 1939.

Fundamental principles of nutrition and their practical application, F. F. Tisdall, *University of Toronto Medical Journal*, January, 1939.

Beryllium Rickets in Chickens, H. D. Branion, F. F. Tisdall and T. G. H. Drake, *Poultry Science*, Vol. XVIII, No. 1, p. 66, January, 1939.

Blood Studies of Vitamin C during pregnancy, birth and early infancy, Charles E. Snelling and S. H. Jackson, *Jour. of Ped.*, Vol. 14, No. 4, p. 447, April, 1939.

Accepted for publication:

Sulphanilamide and Sulphapyridine in the treatment of disease in children, Nelles Silverthorne and Alan Brown, *Can. Med. Assoc. Jour.*

Studies on the Meningococcus and Meningococcus Infection, Nelles Silverthorne, J. G. FitzGerald, Donald T. Fraser and Colin Cameron, *Jour. of Pediatrics.*

Paroxysmal Tachycardia: report of two cases, John D. Keith and Alan Brown, *Amer. Jour. Dis. Child.*

REPORT OF THE DEPARTMENT OF PATHOLOGICAL CHEMISTRY

(Under the direction of Professor Andrew Hunter)

During the current year the following changes have been instituted in the system of instruction practised by this Department. (1) The duration of the fourth year laboratory course has been reduced from three trimesters to two. (2) The lecture course, formerly confined to the fifth year, has been advanced so as to start in the third trimester of the fourth and be completed in the first trimester of the fifth. (3) The examination is to be held just after the Christmas vacation instead of at the end of the fifth year. These changes

form part of the general revision of the whole curriculum lately undertaken by the Faculty of Medicine.

The rearrangement of the courses has been made the occasion of a careful review of their whole content, and, as a result, several changes have been made both in the methods taught in the laboratory and in the topics selected for the lectures. These changes, it is believed, will effect an improvement in the presentation of the subject-matter sufficient in itself to offset the curtailment of the course. Certain methods of blood analysis have perforce been dropped from the work of the fourth year laboratory, but it is proposed to demonstrate these to small groups in the fifth year, a stage at which the student is probably, in any case, better able to appreciate their applications.

The extension to the Western Hospital of the system, by which this Department supervises the clinico-chemical work of students on their hospital cases, has proved to be of definite advantage, and the arrangements made will accordingly be continued.

There has been no change in the Departmental Staff; but during the early part of the session Professor Nicholson was absent on leave. His leave of absence, together with the vacation preceding it, was spent in post-graduate study and research in Europe, chiefly in England.

The number of students registered in the Department during 1938-39 was 273. Of these 137 were fourth year medical students, 132 were fifth year medical students, and 4 (one a member of the staff) were graduate students. Three of the last group were taking Pathological Chemistry as their major subject.

The Department continues to perform certain routine services for other departments. Thus, for the University Health Service it carried out about 1,500 routine urine examinations. It also made 306 determinations of basal metabolic rate on 213 hospital patients (186 surgical and 27 obstetrical or gynaecological).

All of the full-time and most of the part-time members of the departmental staff have been actively engaged in research. Among the fields entered have been those of renal function,

protein chemistry, enzymology and analytical methods as applied to clinical chemistry.

Publications

A. Hunter: "Enzymic Methods for the Preparation of Arginine and Ornithine." *Biochemical Journal*, Vol. XXXIII, p. 27 (1939).

A. G. Gornall and A. Hunter: "1−(+) Cirtulline." *Biochemical Journal*, Vol. XXXIII, p. 170 (1939).

A. G. Gornall and A. Hunter: "The preparation of 1(+)−cirtulline from 1(+)−ornithine or 1(+)−arginine." *Can. Chemistry*, Vol. XXIII, p. 67, (1939).

T. F. Nicholson, R. W. I. Urquhart and D. L. Selby: "Renal Function as Affected by Experimental Unilateral Kidney Lesions. I. Nephrosis due to sodium tartrate." *Jour. Exp. Med.*, Vol. 68, p. 439 (1938).

T. F. Nicholson and R. M. Archibald: "Some Properties of the Reducing Material in Certain Fractions of Normal Urines. III. Some observations on the nature of the non-fermentable reducing substances in 'Fasting' urine." *Biochemical Journal*, Vol. XXXIII, p. 516 (1939).

DEPARTMENT OF PATHOLOGY AND BACTERIOLOGY

(Under the direction of Professor William Boyd)

There have been no major changes in the arrangements of the Department during the past year. The study of Pathology is now commenced in the Third Year, instead of in the Fourth Year as formerly. There has been no examination in General Pathology at the end of the Third Year, but it is probable that it would be wise to institute such an examination.

The Department has acquired a first-class epidiascope for the projection of gross specimens, as well as pictures, etc. The projection on the screen of gross surgical and autopsy material has proved of the greatest value, particularly in clinical-pathological conferences.

The clinical-pathological conferences for the Sixth Year, conducted by the Professor of Medicine and the Professor of Pathology, have been continued. A discussion of combined clinical and pathological material alone somewhat similar lines, has been conducted for the Fifth Year by Dr. Desmond Magner. These discussions have proved a great success and have been very well attended.

The work on the reconstruction of the Museum, described in detail in last year's report, has been continued. One room (Kidney) has been completed, and three other rooms (Lung, Stomach, Nervous System) are approaching completion. The coming year will be largely occupied with work on the room containing the Circulatory System specimens. Many have helped with this work, but I wish to acknowledge especially, the assistance given by Dr. Donald Campbell in the Stomach room, and by Dr. M. G. Whillans in the Neurological room.

A large X-ray viewing box has been installed in the Kidney room. This contains a collection of X-ray films (reductions), Kodachrome colour films, etc., which should prove of great use to the physicians and surgeons who use the Museum for teaching. In the course of time a similar box will be placed in each of the Museum rooms.

The Museum is now being used to a considerable extent for tutorial work in preparation for the F.R.C.P. and F.R.C.S. examinations.

Dr. G. Lyman Duff and Dr. Desmond Magner have continued their experiments on the effect of tyramine injections upon various animal species. They have succeeded in producing in rabbits a type of arteriolar necrosis in brain, heart and kidneys, very similar to that encountered in cases of malignant hypertension in man. These lesions, however, are not produced with regularity, and further experiments have been undertaken in an attempt to discover what factors determine the development of these vascular changes. Dr. H. Hayward studied serial sections of the region of the vomerosphenoidal articulation from a number of routine autopsy cases in an attempt to determine the frequency of occurrence of the so-called pharyngeal pituitary. This study was unfortunately interrupted by illness. Dr. F. P. Dewar has made a histological study of the lungs from autopsy cases in which trauma contributed to death, with a view to determining the frequency of fat embolism unattended by clinical signs of this disease. Fat embolism of minor proportions was found in a large percentage of such cases, while intravascular fat droplets were virtually absent from the lungs of control cases. Cases of exceptional interest encountered among the routine autopsies have been given special study by

various members of the staff with a view to ultimate publication. Dr. A. J. Blanchard has studied and prepared a report of a fatal case of Weil's disease, the first encountered in this Department since 1925. Dr. A. W. Bagnall, in collaboration with Dr. Duff, has made a complete pathological study of an extraordinary case of polyarteritis nodosa, associated with cystic disease of the lungs, a report of which will be published shortly. Dr. Bagnall has also collaborated with Dr. J. C. Richardson of the Department of Medicine in the report of a case of angioma arteriale of the cerebellum.

In the Division of Bacteriology, a programme has been developed under Dr. P. H. Greey's direction and in cooperation with the Department of Medical Research, for an extensive investigation of chemotherapeutic agents. A number of new drugs, prepared in the Department of Medical Research, have been studied by in vitro and in vivo methods and these have been compared with sulphanilamide and dagenan. A systematic search for compounds to be used against the staphylococcus and the tubercle bacillus is well started and will be continued for a number of years. Particular attention was given to the study of dagenan in experimental pneumococcus infection by Dr. Greey and Dr. D. B. MacLaren, and, in association with Dr. C. C. Lucas of the Department of Medical Research, who followed the blood concentration of the drug, the best method of administration in infected white mice was determined. A comparative study was also carried out between this drug and a number of others in the treatment of infected mice. The exhibit on sulphanilamide treatment of urinary tract infections, prepared by Dr. P. H. Greey, Dr. C. C. Lucas, and Dr. D. R. Mitchell of the Department of Surgery, was sent to the meeting of the American Urological Society in Quebec and won second prize. Dr. R. Margarite Price, in her work on tuberculosis, has been studying culture media in an endeavour to find one which will give growth of bovine strains from human cases of tuberculosis without the use of animals. She is planning to visit the European laboratories this summer to study their methods at first hand, particularly in Denmark and Great Britain. In emphasizing the need for universal pasteurization of milk, she investigated an outbreak in 1938 of bovine infection in five

children where the milk supply was not pasteurized, and in which the infection had come from a herd later destroyed. Her critical review of the literature on the problem of the bovine tubercle bacillus in human tuberculosis has been published this year.

The Division of Surgical Pathology, in addition to its heavy diagnostic routine for the Toronto General Hospital, has been carrying on studies of bronchiectasis, gastric ulcer, and gastric carcinoma. A paper summarizing the findings in the pathology of fifty cases of bronchiectasis was presented by Dr. W. L. Robinson, at the annual meeting of the American Association of Pathologists and Bacteriologists at Richmond. It is hoped to have the work on gastric ulcer sufficiently advanced to present at the next meeting of this Association in Pittsburgh.

An innovation in the reporting of surgical pathology diagnoses has been instituted during the past year. In all important cases a sketch is made of the gross specimen and on this is outlined in red ink the important pathological lesion, such as cancer, its extent, etc. This enables the surgeon to see at a glance, the location and extent of the involved area.

Dr. L. M. Gray has been studying testicular tumours and is preparing a paper reporting an especially interesting case with a summary of the subject as a whole.

The Division of Neuropathology, under the direction of Dr. Eric A. Linell, reports a noteworthy increase during the year in the amount of operative material received for examination and report. This increase has caused the institution of a weekly conference between the surgeons responsible for the operations and the other members of the Division.

The number of post-mortem examinations of patients from the Mental Hospitals, (mainly from the Psychiatric Hospital), is slowly increasing and the Staffs of these hospitals are showing a growing interest in the pathological findings in their patients. The attachment of Dr. M. R. Shaver of the staff of the Ministry of Health for service with the Division, has proved of value in this connection.

Dr. J. Clifford Richardson has completed his report on the pathological findings in the recent epidemic of acute anterior poliomyelitis and this material will shortly be ready for

publication. He has also continued his investigation of intracranial aneurysm and has been engaged, in collaboration with Dr. H. H. Hyland, in an important review of cases of subarachnoid haemorrhage. Their combined detailed report will be published in the near future. Dr. Richardson is also collaborating with Dr. A. W. Bagnall in the report of a case of haemangioma of the cerebellum.

Dr. K. G. McKenzie has, during the winter, reviewed his series of cases of meningioma and of spinal cord tumours, and has delivered papers describing his findings in both series.

Dr. E. H. Botterell is continuing his investigations of injuries to the nervous system. He has collected a considerable amount of important pathological material, more particularly with reference to injuries of the cervical spine.

Dr. M. G. Whillans is reviewing for publication the cases of subdural empyema, which are in the files of the Division. Dr. Whillans has also collaborated with Dr. P. H. Greey in an investigation of cerebal lesions, caused by pneumococcal infections of mice.

Dr. M. R. Shaver has collected from the files of the Division, and in collaboration with Dr. K. G. McKenzie and Dr. W. S. Keith, cases of cyst of the third ventricle. He is preparing a paper on this subject.

Dr. Linell has completed his investigations, in collaboration with Dr. E. Hall, of histological changes following insulin and metrazol injections in rabbits. The former has investigated haemorrhages into the brain-stem, produced by head injury, and gave a paper on this subject before the American Association of Pathologists and Bacteriologists in March, 1939.

The Staff Meetings originated by the late Professor Oskar Klotz have been started again. These have proved a great success, being attended not only by members of the Department of Pathology and Bacteriology, but also by pathologists from the various Toronto hospitals and laboratories as well as from Hamilton, London and other places in the neighbourhood.

The head of the department gave the Mütter Lecture at the College of Physicians of Philadelphia, the Mercy Day address at Pittsburgh, as well as addresses in Boston, New York, Oklahoma City, Victoria, Montreal, Kingston, Richmond and Omaha.

Boyd, William: The General Pathology of Cancer. *Chapter I, Handbook on Cancer, Canad. Med. Association*, Murray Printing Co. Toronto.

Dr. Maude E. Abott. *J. Tech. Methods and Bull. Inter. Assoc. Med. Museums*, Vol. 18, p. 1-2, 1938.

Growth, Normal and Abnormal. *Manitoba Essays, Winnipeg*, p. 312-322, 1938.

The Early Diagnosis of Cancer. *"Convention Book", Assoc. of Med. Students*, 1938.

Surgical Pathology. *W. B. Saunders, Philadelphia*, 4th ed., 1938.

Some Reasons for the Recent Increases of Bronchial Carcinoma. *Trans. and Studies Coll. Physicians of Phila.*, Vol. 6, p. 317-328, 1939.

Inflammation and Repair of Tissue. *Christopher's Testbook of Surgery*, Chapter 1, page 1, 1939.

Duff, G. Lyman with Farquharson, R. F. and Belt, T. H.: Simmonds' Disease: Clinical and Pathological Observations on Four Cases. *Trans. Am. Clin. and Climatological Assn.*, Vol. 54, p. 106-123, 1938.

Duff, G. Lyman and Magner, Desmond with Hamilton, John D.: Experimental Production of Arteriolonecrosis and Medionecrosis of Arteries by Means of Tyramine Injections. *Proc. Soc. Exper. Biol. and Med.*, Vol. 41, p. 295-297, 1939.

Erb, I. H., Doyle, H. S. and Heal, F. C.: Blood Groups in Poliomyelitis. *Canad. Pub. Health J.*, Vol. 29, p. 441-442, 1938.

Greey, P. H.: Remarks on Chemotherapy. *Univ. of Toronto Med. J.*, Vol. 16, p. 229-233, 1939.

Experimental Studies with Sulphanilamide and Other Compounds. *Canad. M.A.J.*, Vol. 39, p. 12-15, 1938.

The Detection of Colonies of Pneumococci and Streptococci on Blood Agar by Dried Bile. *J. Infect. Dis.*, Vol. 64, p. 206-207, 1939.

Greey, P. H., Campbell, H. H. and Culley, A. W.: Effect of Sulphanilamide on Experimental Tuberculosis in the Guinea Pig. *Proc. Soc. Exper. Biol. and Med.*, Vol. 39, p. 22-24, 1938.

Greey, P. H., Boddington, G. D. M. and Little, M. H.: Sulphanilamide and Related Compounds in Experimental Tuberculosis. *Prof. Soc. Exper. Biol. and Med.*, Vol. 40, p. 418-420, 1939.

Greey, P. H. and MacLaren, D. B. with Lucas, C. C.: Comparative Chemotherapy in Experimental Pneumococcal Infections. *Canad. M.A.J.*, Vol. 40, p. 319-324, 1939.

Greey, P. H. with Mitchell, D. R. and Lucas, C. C.: Sulphanilamide in the Treatment of Cystitis and Pyelitis. *Canad. M.A.J.*, Vol. 40, p. 336-342, 1939.

Klotz, M. O.: Primary Carcinoma of the Lung. *Am. J. M. Sc.*, Vol. 196, p. 436-454, 1938.

The Association of Silicosis and Carcinoma of the Lung. *Am. J. Cancer*, Vol. 35, p. 38-49, 1939.

McKenzie, K. G.: Extradural Haemorrhage. *Brit. J. Surg.*, Vol. 26, p. 346-365, 1938.

Price, R. M.: Bovine Tuberculosis in Children. *Canad. Pub. Health J.*, Vol. 29, p. 251-254, 1938.

The Bovine Tubercle Bacillus in Human Tuberculosis. *Am. J. M. Sc.*, Vol. 197, p. 411-427, 1939.

DEPARTMENT OF PHARMACOLOGY

(*Under the direction of Professor V. E. Henderson*)

Owing to the strengthening of the staff by the inclusion of Prof. J. K. W. Ferguson and the retention of Dr. D. D. Bonnycastle as Fellow, the teaching in the Department has been very strong this year. Both Professors Lucas and Ferguson contributed to the lectures and with myself took groups of students throughout the year for Socratic instruction, so that each student got a good deal of personal instruction.

The research in the Department has proceeded satisfactorily. Prof. Lucas has been studying methods for the identification of alkaloids secreted by the saliva and has an exhaustive paper on this topic nearly finished. Prof. Ferguson has continued his studies of the mechanism of the secretion of the active principles of the pituitary in labour. This is being reported at the meeting of the American Physiological Society and will be submitted for publication. He has also in press a study of the anaesthetic properties of Allene, a possible contaminent of cyclopropane. He is also studying the extra respiratory reflexes. Dr. Bonnycastle has in press, a paper dealing with the effects of procaine, used so much in spinal anaesthesia. He has shown conclusively that its danger lies in the paralysis of the nerves to the diaphragm, rather than on the centre. He is also studying the effects of drugs on hypertension.

Dr. Rice and myself published a paper dealing with the effects of certain drugs on respiration, and particularly on respiratory reflexes. Dr. Rice also published a paper on the vagal reflexes affecting respiration.

A study has also been made of the anaesthetic actions of methyl acetylene, another possible contaminent of cyclopropane, by myself, and with Prof. Lucas a study has been made of the proposed pharmacopoeial definitions of cyclopropane.

Publications

Rice, H. V.: Pharmacological actions of corlumine. *J. Pharm. Exp. Thera.* 63. 329. 1938.

Henderson, V. E.: The search for an ideal anaesthetic. *Trans. R.S.C.* Series III. 32. 1. 1938.

Anaesthetic effects of chlorine derivatives of cyclopropane. *J. Pharm. Exp. Thera.* 64. 225. 1938.

Lucas, G. H. W. and Bonnycastle, D. D.: A study of the action of adrenaline on the intestine. *Arch. internat. Pharmacod.* 60. 195. 1938.
Rice, H. V.: Respiratory vagal reflexes and carbon dioxide. *Am. J. Physiol.* 124. 535. 1938.
Haterius, H. O. and Ferguson, J. K. W. Evidence for the hormonal nature of the oxytocic principle of the hypophysis. *Am. J. Physiol.* 124. 314. 1938.
Hitchcock, F. A. and Ferguson, J. K. W.: Respiratory and circulatory adjustments to the erect posture. *Am. J. Physiol.* 124. 457. 1938.
Ferguson, J. K. W., Horvath, S. M. and Pappenheimer, J. R.: The transport of carbon dioxide by erythrocytes and plasma in dogfish blood. *Biol. Bull.* 75. 381. 1938.
Ferguson, J. K. W.: Benzedrine sulphate. *U. of T. Med. J.* 16. 234. 1939.
Bonnycastle, D. D.: The effect of procain on the respiratory mechanisms. *Anesth. and Analg.* 18. 164. 1939.
Lucas, G. H. W.: The saliva test. *Can. J. Comp. Med.* Mar., 1939.

DEPARTMENT OF PHYSIOLOGY

(Under the direction of Professor C. H. Best)

The members of the staff of the Department of Physiology have gained the impression during this year, that too much work is being concentrated in the Third Year. The previous arrangement, under which part of this subject was taught in the Second Year, would appear to be preferable.

The Head of the Department has delivered a number of lectures in other universities since last year's report was prepared. The Stephen Paget lecture was given on June 6th in the London School of Hygiene, on "Insulin and Diabetes—the Present Position". A lecture on "Heparin and Thrombosis" was presented at University College, University of London, on June 9th. Lectures were also given at the British Postgraduate Hospital and at St. George's Hospital. A Mayo Foundation lecture on "Heparin and Thrombosis" was given on October 31st in Rochester, Minnesota. The inaugural Renziehausen lecture on "Historical and Recent Developments of the Insulin Situation" was presented on December 5th at Pittsburgh. An Eastman Foundation lecture on "Thrombosis" was given on December 16th in Rochester, New York, a lecture on "Thrombosis" was given at Yale on March 8th and a lecture on "Insulin and Diabetes" at Harvard on March 9th.

A particularly productive year in research has been enjoyed. Dr. R. E. Haist, assisted by Miss H. J. Bell and working in conjunction with Miss J. H. Ridout of the Department of Physiological Hygiene, and Dr. Best, has shown that diet very definitely influences the insulin content of the pancreas. When diets rich in fat are given, a marked decrease in the insulin content can be determined within one week. These results open up many new fields for investigation. Dr. Haist has been awarded the Starr Gold Medal for 1939.

Dr. James Campbell and Dr. Haist, working under the general direction of the Head of the Department, have shown that there is a prompt fall in the insulin content of dogs' pancreas when diabetogenic preparations of the pituitary gland are administered. After seven daily injections the insulin content is reduced to extremely low levels, but returns sharply to the normal value when the injections are discontinued. If, however, the injections are maintained for 15 to 20 days, the insulin content usually remains at the low value when the injections are stopped. Dr. Campbell and Mr. H. C. Keenan have made considerable progress in the fractionation of the diabetogenic substances and have been studying as well, those materials in the anterior pituitary extract which increase the deposition of fat in the liver, produce ketosis, and promote lactation. Mr. Keenan, who held a Reuben Wells Leonard Fellowship from University College during the year, has elaborated a very useful method of testing ketogenic preparations.

Professor N. B. Taylor has been unable to devote as much time to research as he would like, owing to his being occupied with the revision of the physiological text of which a new edition is to appear in the autumn. In Dr. Taylor's section, research upon intestinal obstruction is being continued by Dr. W. F. Greenwood, who is devoting a year to research in the department. Dr. Greenwood, with the assistance of Miss L. E. M. Roddy, has also investigated the blood potassium in animals dying of acute intestinal obstruction. Experiments upon renal hypertension have been carried out by Dr. Greenwood, with Dr. R. Nassim, who is on leave of absence from St. George's Hospital, London, and some results of great interest have been secured. A rapidly developed hyper-

tension (over 200 mm. Hg., with retinal and intestinal haemorrhages and enormous enlargement of the heart) has been produced in dogs by preventing the renal hypertrophy which ordinarily results from the removal of one kidney. Hypertrophy of the remaining kidney was prevented by enclosing it in a coat of collodion-soaked gauze. These results suggest that the essential factor in the development of renal hypertension is the inability of the kidney to increase its activity proportionately to the work demanded of it.

The section of biophysics, under the direction of Dr. D. Y. Solandt, has carried out physiological research along a variety of lines. Polarization at the neuromuscular junction and its effect on excitation has been studied. A survey of possible methods of modifying the denervation degeneration in the skeletal muscle of the rat is being undertaken with a view to gaining a better understanding of this process. It is also hoped that the results will prove useful in evaluating the methods used in the treatment of denervated muscles in humans. Mr. J. W. Scott has completed the work on the relation of the "reaction of degeneration" to the Sherrington phenomenon in skeletal muscle. He is proceeding with a study of the site of excitation in the so-called direct excitation of muscle. An oscillator and vibrator for testing vibration sense have been designed and constructed with the help of Mr. J. D. Brown. Using this equipment, Dr. E. H. Botterell and Dr. Solandt have collaborated in testing normal and abnormal vibration sense in man. Mr. W. D. Gray has studied the relation of non-electrolytes in the environment of nerve tissue to the excitability constants of that tissue. An adjustable renal artery clamp and applicator have been designed and constructed. In collaboration with Dr. Nassim, this clamp has been used to produce the Goldblatt type of hypertension in dogs. These animals were then, through the use of a special pump, studied during and following "pressure-isolating" cross circulation with normal animals. In collaboration with the Head of the Department, studies are at present being made on the relation of dietary choline to acetylcholine production in rats. An outline of the collaborative work of this section with the staff in the Department of Physiological Hygiene in the study of the effect of heparin on cardiac mural

thrombus formation and on certain aspects of blood clotting is given elsewhere.

Dr. Botterell, in collaboration with Dr. Solandt, has performed a number of experiments on cats in an effort to determine the significance of the central control of micturition. It has been difficult to establish the normal cystometrogram, and they have studied several curarized animals with this object in view. Dr. Botterell, in collaboration with Dr. K. G. McKenzie, Dr. David Pratt and Dr. W. S. Keith, is writing a neurosurgical guide for medical students. His section of this small book deals with the examination of the nervous system and the interpretation of findings. Actually, it is a summary of the applied physiology of certain aspects of neurology.

The work begun last session and outlined in last year's report on the rôle of the liver in canine anaphylaxis has been continued by Dr. E. T. Waters and Mr. L. B. Jaques, who have found it possible to isolate crystals of heparin from the blood of dogs in anaphylactic shock. This conclusively proves that the marked increase in the clotting time of the blood in anaphylaxis is due, at least in part, to the liberation of heparin from the liver. An interesting observation made in connection with these studies is that heparin crystals contain an appreciable amount of water of crystallization, a fact to be borne in mind when comparing the potency of various heparin preparations. Dr. Waters, Dr. J. Markowitz and Mr. Jaques have demonstrated sensitization in a dog with an Eck fistula; a typical anaphylactic reaction was obtained, except that there was no engorgement of the liver.

Dr. Waters and Dr. Jean P. Fletcher have made a study of the product of enzymic hydrolysis of glycogen by a glycerol extract of muscle. The late Dr. A. D. Barbour of this University stated the sole product of this reaction to be a trisaccharide, but a number of independent investigators have failed to confirm this finding. The product which we have isolated, in excellent yield, has properties very similar to those reported by Barbour, and as the result of much careful testing we can now state that the material, while not homogeneous, is chiefly a trisaccharide composed of three glucose units.

Such a compound has obvious chemical as well as physiological interest.

Dr. E. Fidlar has collaborated with a number of his colleagues in a great variety of researches during the last year, and results of very considerable importance have been obtained. Working with Dr. Waters, Dr. Markowitz and Mr. Jaques, he has shown that a very sharp drop in platelet count takes place after injection of anti-genic serum into sensitized dogs. This was first done in hepatectomized animals, and subsequently in animals with the liver present. In a series of experiments with Dr. Waters, Dr. Fidlar has found that the blood platelets are greatly reduced in number and show evidence of clumping in peptone shock. Dr. Fidlar and Dr. Waters have also studied the platelet counts in the blood of heart-lung preparations, and have thus far failed to confirm Howell's theory that platelets are produced in the lung. Dr. Fidlar has shown that there is a very rapid drop in platelet count in dogs in which the blood has been made to flow through glass cannulae, where large white thrombi form. Dr. Fidlar, working with Dr. E. W. McHenry and Miss M. Sheppard of the Department of Physiological Hygiene, has made a very interesting study of the increase in metabolic rate observed in guinea-pigs placed on a diet deficient in vitamin C. Dr. Fidlar has collaborated with Dr. James Campbell in a study of the basal metabolic rate of dogs at various intervals after the injection of diabetogenic preparations of the anterior pituitary gland.

Publications

Best, C. H.: Insulin and diabetes; the present position. *Research Defence Society Publications*, vol. xxvi, 1938.
Heparin and thrombosis. *Brit. Med. J.*, 1938, ii, 977.
Heparin and the formation of white thrombi. *Proc. Internat. Physiol. Cong. Zurich*, 1938.

Botterell, E. H. and Fulton, J. F.: Functional localization in the cerebellum of primates. *J. Comp. Neur.*, 1938, *69*, 31.

Campbell, J.: A method of assaying the potency of anterior pituitary extracts which increase liver fat. *Endocrin.*, 1938, *23*, 692.

Campbell, J. and Best, C. H.: Production of diabetes in dogs by anterior pituitary extracts. *Lancet*, 1938, i, 1444.

Fidlar, E., Sheppard, M. and McHenry, E. W.: The physiological properties of ascorbic acid. II. The increase in metabolism of guinea-pigs on a diet deficient in ascorbic acid. *Biochem. J.*, 1939, *33*, 344.

Fletcher, J. P. and Waters, E. T.: The utilization of various metabolites (blood fat and lactate, cardiac and lung glycogen) in the aglycaemic heart-lung preparation. *J. Physiol.*, 1938, *94*, 337.
Jaques, L. B.: The nitrogen partition in blood clotting. *Biochem. J.*, 1938, *32*, 75.
The nitrogen partition in blood clotting. *Biochem. J.*, 1938, *32*, 75.
The effect of intravenous injections of heparin in the dog. *Am. J. Physiol.*, 1939, 125, 98.
Heparin. *Univ. of Toronto Med. J.*, 1939, *16*, 185.
Jaques, L. B., Charles, A. F. and Best, C. H.: The administration of heparin. *Acta Med. Scandinav.*, 1938, Supp. *90*, 190.
Solandt, D. Y. Excitation of denervated skeletal muscle. *Proc. Internat. Physiol. Cong. Zurich*, 1938.
Solandt, D. Y. and Best, C. H. Heparin and coronary thrombosis in experimental animals. *Lancet*, 1938, ii, 130.
Thalhimer, W., Solandt, D. Y. and Best, C. H.: Experimental exchange transfusion using purified heparin. *Lancet*, 1938, ii, 554.
Waters, E. T.: Metabolism of sorbitol. *Proc. Internat. Physiol. Cong. Zurich*, 1938.
Young, F. G., Waters, E. T., Markowitz, J. and Best, C. H.: Effects of administration of some carbohydrate derivatives on hypoglycemic symptoms of the hepatectomized dog. *Am. J. Physiol.*, 1938, *124*, 295.

DEPARTMENT OF PSYCHIATRY

(Under the direction of Professor C. B. Farrar)

The most important development of the year has been the organization of a research unit at the Toronto Psychiatric Hospital, made possible by a grant from the Rockefeller Foundation jointly to the department of psychiatry and the department of medical research. For this purpose, a ward clinic of twenty beds has been set aside on the third floor of the hospital, with clinical staff provided by the Department of Health, and with laboratories for biochemistry and electroencephalography equipped and staffed by the Department of Medical Research. Initial studies now under way will compare the effects of various type of pharmacologic shock. Selected early cases of schizophrenic reaction will first be investigated, with a view to determining possible common features of various forms of treatment which empirically have been found beneficial.

From the teaching standpoint the research unit will serve mainly for the instruction of graduate physicians and nurses.

The plan of undergraduate instruction has been modified somewhat in order to include a greater amount of clinical material. While the general plan of the courses of the three

upper years remains the same, the clinical demonstration of patients begins with the fourth year and occupies the major portion of the time throughout the three years.

The graduate course leading to the diploma in psychiatry was completed by six physicians. The Faulkner medal for highest standing was awarded to Dr. T. A. Sweet.

Staff changes include the promotion of Dr. C. H. McCuaig from the grade of demonstrator to that of associate; and the appointment of Dr. L. D. Proctor as research fellow.

DEPARTMENT OF SURGERY

(*Under the direction of Professor W. E. Gallie*)

The session of 1938-39 has been a year in which the general plans for improvement in the practical clinical training of our students, as outlined in previous reports, have been fully carried out and submitted to critical observation. The consensus of opinion among the teachers is that while improvements can still be made, the opportunities now afforded, both for scientific and clinical study are very good, and that the old criticism that the course was too theoretical and not sufficiently practical can no longer be advanced.

It is still a much discussed question as to what should be taught in an undergraduate course in surgery. Some schools, for instance, give courses in operative surgery on animals and on the cadaver, with the declared intention of training all the students in the principles of technique. Others go to the opposite extreme, and allow their students no practical training whatever, other than that obtained from attendance at clinics, reading and observation. Our plan involves a middle course which is based on the idea that while each student must be thoroughly trained in a practical way in the diagnosis of those diseases which are essentially surgical, he shall not be trained in technique until after his experience as a rotating intern has shown him that he has some real aptitude for surgery. We are definitely committed to the idea that surgery has grown to such proportions that no man should engage in it unless he has taken several years of postgraduate training as a house-surgeon in a service in which he is gradually

stepped up from the position of a second assistant to that of a surgeon performing the various operations under the critical eye of his teacher. The undergraduate course in this school, therefore, is devoted to teaching the essentials of surgical anatomy and pathology, and to giving a thorough training in methods of examination and diagnosis. To this is added just enough of the technique of the surgery of everyday office and visiting practice, as seen in the outpatient and emergency departments, and of that of the general operating room, acquired by acting as a second assistant in operations on his own cases, to stimulate the student's interest in his work and perhaps to arouse in some an enthusiasm for post-graduate training later on.

The training of prospective surgeons in this school is now a serious undertaking, with a definite plan of study involved. Following a year of rotating internship, the successful applicants for the surgical course register as candidates for the Master of Surgery degree. To obtain this, they must first pass an examination in anatomy and physiology in this university, or produce a certificate of having passed the primary examination for the F.R.C.S. of Canada, or a similar examination for one of the Royal Colleges of Great Britain. This examination may be taken at any time during the course, but many of the candidates take a year off to prepare for it, during which, through the kindly cooperation of the Departments of Anatomy and Physiology, they act as demonstrators in those departments and are granted an honorarium sufficient to cover their expenses.

The three years of the course are made up of six months in medicine, six months in pathology, one year in general surgery, in which the student acts as senior house-surgeon on one of the divisions, and a final year in which he serves six months each in two of the three options—urology, neurosurgery and the surgery of childhood. He is then qualified to try the final examination for the M.S. This year there were three successful candidates, *i.e.*, Dr. Carl Aberhart, Dr. Jessie Gray and Dr. J. C. Scott. Drs. Aberhart and Gray are both gold medallists from this school and Dr. Scott is a fellow of the Royal College of Surgeons of England and is now

established in Oxford as Surgeon to the Wingfield Morris Orthoepaedic Hospital.

This postgraduate course has now been in action for eight years and there are thirty young men who have either completed it or are still in training. Those who have graduated, have already given proof that the hopes of the department that a steady supply of fully qualified young surgeons might be provided for our country have been realized.

A successful experiment in the higher education of young surgeons has been carried out this year, in an exchange with Middlesex Hospital in London, England. In this exchange, Middlesex sent to us—Dr. Anthony Till, Mr. Gordon-Taylor's surgical registrar, and we sent to them Dr. Stuart Thomson, who had just completed his service as Resident Surgeon at the Toronto General Hospital. The experiment proved highly successful from the standpoint of both schools and will be repeated from time to time.

The staff changes for the coming year are as follows:

Fellow in Surgery and Junior Surgeon, Division of Urology, Toronto General Hospital. Dr. Carl Aberhart.
Fellow in Surgery and Junior Surgeon, Hospital for Sick Children. Dr. Dr. Stuart Thomson.
Resident Surgeon, Toronto General Hospital, J. R. F. Mills.
Resident Surgeon, St. Michael's Hospital. Dr. W. D. Smith.
Resident Surgeon, Hospital for Sick Children. Dr. F. R. Wilkinson.

This year, this department and the university were much honoured by the appointment of Dr. Gordon Murray as Hunterian Professor in the Royal College of Surgeons of England. Dr. Murray delivered his lecture on, "Experimental and Clinical Studies on the Use of Heparin" before the College on June twelfth, and later addressed the medical staffs of the London and St. Mary's Hospitals, and read a paper at the Royal Society of Medicine. His presentations were well received, and will add to the reputation of our school abroad.

The laboratory and clinical researches, on the use of heparin, have been continued by Dr. Murray and Dr. Ross MacKenzie throughout the year. As time goes on, it becomes more and more apparent that the tendency to thrombosis, following injury to the intima of blood-vessels, can be controlled by the intravenous administration of heparin, and that by its use many surgical disasters can be avoided. Thus, in a

case of accidental rupture of the brachial artery, an end-to-end suture was performed with immediate and permanent restoration of the pulse at the wrist. This suggests at once, that in wartime it might be possible sometimes to repair wounds of great vessels and so save lives and limbs. This idea is made more attractive by the demonstration that segments of arteries can be removed and replaced by veins as has been done many times on animals, and in one patient suffering from a large syphilitic aneurism of the popliteal artery. During this year, also, four cases of thrombosis of the mesenteric veins have been operated upon successfully, without recurrence of the thrombosis following removal of the gangrenous bowel. As indicated in the published papers, the results in the operative removal of emboli from the peripheral arteries have been highly successful and by eliminating the risk of thrombosis at the site of the incision in the artery, the use of heparin has greatly improved the usefulness of the operation.

During this year, a study on animals was conducted by Dr. R. I. Harris and Mr. Anthony Till, on the development of a technique for the removal of growths from the lower end of the oesophagus. Dr. Stuart Gordon has commenced an experimental study of the possibilities of the transplantation of tendon sheaths and synovial membrane in the repair of injuries of tendons. Dr. David Mitchell, working with members of the Department of Medical Research, has continued studies in the control of urinary infections. Dr. K. G. McKenzie and Dr. E. H. Botterell, in conjunction with Mr. Goodwin of the Department of Medical Research, have made a beginning in the use of the new electro-encephalograph for the localization of tumours in the brain. Dr. J. H. Couch has brought to the press a small book on the surgery of the hand, which will prove useful both to students and practitioners. Dr. F. I. Lewis and the head of the department, have completed their study of a method of treating ununited fracture of the neck of the femur in the old, by means of nail and bonegraft.

Progress is being made in the development of a Museum of Applied Anatomy. Through the courtesy of Professor Grant, material has been made available and Dr. Ross MacKenzie has prepared many beautiful dissections for mounting in the

surgical laboratories, which are useful both for teaching and for refreshing the surgeon's memory in the face of unusual operations.

The department acknowledges with thanks the steady support and assistance it has received from both the clinical and scientific departments, in routine work and in investigations.

The following papers by members of the staff have been published during the year:

E. H. Botterell: Functional Localization in the Cerebellum of Primates. *Journal of Comparative Neurology*, August, 1938.

W. G. Carscadden: Empyema. *C.M.A.J.*, 40, 120-123, 1939.
Acute Perforation Carcinoma of the Large Bowel. *Academy of Medicine Bulletin*, August, 1938.

J. H. Couch: Infections in Hands. *U. of T. Medical Journal*, March, 1939.
Identical Dupuytren's contracture in Identical Twins. *C.M.A.J.*, 39, 225-226, 1938.

J. T. Danis: Pruritis Ani. *U. of T. Medical Journal*, April, 1939.

G. S. Foulds: Endothelioma of the Corpora Cavernosa. *The Journal of Urology*, December, 1938.
Pyelitis of Pregnancy and the Puerperium. *The British Journal of Urology*, June, 1939. (With G. R. Hall.)
Epithelioma of the Male Urethra. *The Urologic and Cutaneous Review*, Vol. XLII, No. 9, 1938.

S. D. Gordon.: The Scope of Plastic Surgery. *The U. of T. Medical Journal*, January, 1939.

R. R. Graham: The Management of a Patient Suffering from Duodenal Ulcer. *New International Clinics*, Vol. 1, Series 2, 1939.

F. G. Kergin: Appendicitis. *The University of Toronto Medical Journal*, February, 1939.

D. R. Mitchell: Treatment of Urinary Infections in Children with Sulfanilamide. *The Journal of Urology*, January, 1939. (With Pearl Summerfeldt.)
A Biochemical study of Patients on Sulphanilamide Therapy. *C.M.A.J.*, 40, 27-34, 1939. (With C. C. Lucas.)
Sulphanilamide in the treatment of Cystitis and Pyelitis. *C.M.A.J.*, 40, 336-342, 1939. (With P. H. Greey and C. C. Lucas.)

D. W. G. Murray: The Use of Heparin in Thrombosis. *Annals of Surgery*, August, 1938.

J. C. McClelland: Endometriosis of the Urinary Bladder. *Transactions of the American Association of Genito-Urinary Surgeons for 1938*, Page 215-19.
Renal Tumors. *The Urologic and Cutaneous Review*, Vol. XLII No. 9, 1938. (With J. R. F. Mills.)

K. G. McKenzie: Extradural Haemorrhage. *The British Journal of Surgery*, Vol. XXVI, No. 102, 1938.

D. W. Pratt: Successful Excision of a Tumour of the Pineal Gland. *C.M.A.J.*, 39, 240-243, 1938.

E. S. Ryerson: A Proposal Regarding Interne Education and Supervision. *The Canadian Hospital*, February, 1938.

E. E. Shouldice: The Use of Fascia Lata in the Treatment of the Metatarsal arches. *C.M.A.J.*, August, 1939.

C. H. Watson and T. R. Sarjeant: The Significance of a Low Leucocyte count in acute Pyogenic Infections. *C.M.A.J.*, 39, 460-464, 1938.

DEPARTMENT OF THERAPEUTICS

(Under the direction of Professor R. F. Farquharson)

The general plan of teaching described in former reports has been continued. Increasing attention has been paid to the practical application of treatment to patients of all kinds, presented at the weekly clinical lectures to the Fifth Year.

Drs. J. W. Magladery, J. A. McGeachy and H. C. Hair, Senior Internes in Medicine at the Toronto General Hospital, were appointed Assistants in Therapeutics, in which capacity they have given practical instruction in therapeutics to small groups of final year students on the medical wards.

Dr. A. H. Squires, Research Fellow in Therapeutics, has continued the study of the effect of prolonged administration of thyroid in obesity and other conditions. He has also continued the study of the effects of large doses of irradiated ergosterol and dihydrotachysterol in treatment of patients suffering from parathyroid tetany.

As formerly, research work in Therapeutics has been closely associated with similar activities in the Department of Medicine. In particular, a careful study of the results of prolonged treatment of patients suffering from pernicious anaemia has been carried on. Further investigation of anorexia nervosa and its relation to various endocrine diseases has been made and, in association with Dr. H. H. Hyland of the Department of Medicine, a report of part of this work has been published.

The continued advice and general cooperation of Professor Duncan Graham and his Staff is gratefully acknowledged.

Sub-Department of Anaesthesia

Teaching in anaesthesia has been extended by giving regular clinics to small groups of students. Interest in anaesthesia has been further increased by the institution of term examinations for the final year, conducted at the end of the trimester in surgery.

Sub-Department of Physiotherapy

The time allotted to the teaching of physical therapy, including manipulation, has been doubled and its value increased by dividing each group in two. This has made the hours of teaching four times greater than previously given. The practical value of the course has been increased greatly. The department is indebted to Miss R. Shilton, Chief Instructor in Physiotherapy, University of Toronto, who has given freely of her time. Her teaching has been clear, practical and effective.

THE DEPARTMENT OF MEDICAL RESEARCH

(Under the direction of Sir Frederick Banting)

Dr. Banting has continued his work on the experimental tumour problem, but unfortunately, this work was greatly interrupted by his survey of Canadian Universities and Hospitals made under the auspices of the Associate Committee on Medical Research of the National Research Council of Canada.

The work, under the direction of Dr. W. R. Franks, has been largely confined to the further study of synthetic antigens and serologically active derivatives, particularly those related to carcinogenesis. Dr. Franks has found that the administration of antigens formed by linking dibenzanthracene to casein, reduces tumour production, from various sources, significantly. He has also shown that the degree of protection against carcinogenesis varies inversely with the tumour incidence in the groups studied and that heredity also influences the response.

During the year the methods of conjugating carcinogens to protein have been improved.

Mr. L. F. King, working under an Eli Lilly Fellowship, and Dr. Franks have been studying the use of non-carcinogenic sulphonyl chloride derivatives of the carcinogens for conjugation. The immunological activity of substances so linked has been established and the sulphonic derivatives of some of the carcinogens have been prepared. Similar con-

jugation of oestrone and other oestrogenically active compounds is being studied.

An exploration of the immunizing activity of various conjugates of carcinogens and their derivatives has been commenced. The synthesis of suitable derivatives of the carcinogenic hydrocarbon has been undertaken by Dr. H. J. Creech, working at Harvard University under a grant from the International Cancer Research Foundation and as a part-time Fellow in this Department. Two compounds, thus prepared, have been used in immunization studies in our laboratory. Mr. W. N. Keefe has studied, with Dr. Franks, the preparation of derivatives of the carcinogenic azo compounds suitable for antigen formation.

Mr. G. A. Meek and Dr. Franks have been using step molecular films to follow immunological reactivity. This technique is particularly valuable in detecting the degree of cross reaction between prosthetic substances. Results have been applied to the immunization studies in mice.

The immunization studies connected with the various aspects of the tumour problem have been carried out by Miss M. M. Shaw and Dr. Franks.

Some factors which might possibly influence antibody production have been studied by Mr. F. B. Thomson and Mr. R. C. Smith, who investigated the influence of hypophysectomy and serum protein replacement following plasmaphoresis, on hemolysin production.

The influence of irradiation on the metabolism of tumours is still being studied by Dr. Franks and Mr. G. J. Millar. The irradiation of the animals has been carried out with the cooperation of the Department of Radiology.

The work on the conjugation of substances isolated from the tubercle bacilli in an endeavour to form new antigens, is being continued by Dr. Franks and Miss E. Grant. Dr. P. H. Greey, of the Department of Pathology and Bacteriology, has cooperated with these workers in the animal experiments.

The work on experimental heart disease which has been in progress for several years, has been financed, in part, this year, by a grant from the Josiah Macy Jr. Foundation, New York, who have also provided three fellowships for this work.

Dr. C. G. McEachern, Mr. G. W. Manning and Dr. G. E. Hall, have shown that although the size of the infarct produced in myocardium following ligation of a major coronary artery, is the same in the anaesthetized and conscious states, the mortality is greatly reduced under anaesthesia. Similar ligation with the animal under the influence of atropine reduced the mortality from 75 per cent. to 50 per cent.; when the cardio-sensory pathways were removed on one side, the mortality following ligation in the conscious state was reduced to 30 per cent., while total ablation of the cardio-sensory nerves reduced the mortality to less than 10 per cent., although the size of the infarct remained the same. Other drugs are being investigated in relation to their influence on cardiac pain and mortality following coronary occlusion.

Dr. J. M. Janes and Dr. Hall have been studying the relationship between the cardiovascular system and the biliary tract. It has been shown that in some instances, distention of the gall bladder caused cardiac irregularities, but no chronic cardiac changes could be definitely associated with chronic cholecystitis.

Dr. Janes has also studied the relationship of experimental hypertension to cardiac function and has been investigating methods of increasing the blood flow to ischemic kidneys.

Dr. Janes, Dr. I. W. Mann and Dr. Hall, have been studying experimental cholesterol atherosclerosis in various species of animals and found that ordinarily such lesions can only be produced in rabbits.

Dr. Mann has also attempted to produce arterial changes in rats by the prolonged feeding of lecithin, cephalin, sphingomyelin and total crude phospholipids of adrenal and brain origin.

Mr. Manning and Miss Lang have studied the effect on blood sugar of the parasympathetic drugs atropine, pilocarpine, eserine, etc. in normal, adrenalectomized and depancreatized dogs.

Dr. Mann and Dr. Hall have investigated the influence of vitamin D, thyroid extract and acetylcholine, singly and in combination, upon the cardiovascular system in rats. They have found that of these agents, only acetylcholine produces endothelial changes in the arteries. Dr. Hall has also shown

that calcareous changes can be produced in the coronary arteries, aorta and heart muscle of rabbits following the subcutaneous injection of acetylcholine.

Mr. D. W. Lougheed has made extensive physiological and biochemical studies following the intravenous injection of oxygen, carbon dioxide, nitrogen, helium and air into animals. The problem of asphyxia has also studied by Mr. Lougheed and later, in conjunction with Dr. Janes, Mr. Manning, Dr. Banting and Dr. Hall, physiological studies in experimental drowning were carried out. The results of these experiments may be applied directly to human cases.

The problem of the physiological significance of metrazol and insulin shock therapy in the treatment of schizophrenia has been continued by Mr. J. E. Goodwin, Mr. F. L. Lawson, Mr. W. K. Kerr and Dr. Hall. Through a grant from the Scottish Rite Masons, Northern Jurisdiction, an intensive study was made on the changes in the electrical activity of various regions of the brain in response to intravenous and locally applied metrazol.

Miss Lang, Mr. B. Leibel and Dr. Hall have studied the influence of various drugs, which affect the autonomic nervous system, on the effects produced by subsequent injections of metrazol. This series of experiments has been followed by the work of Mr. Lougheed, in which a detailed study of the blood gases, alveolar air, systematic and pulmonary blood blood pressures, heart rate, splanchnic volume, etc., was made before, during and after metrazol shock.

Through the generosity of the Rockefeller Foundation, clinical research, in conjunction with the Department of Psychiatry has been made possible. A thorough physiological, pharmacological and biochemical study has been started by Dr. Hall with Mr. Lougheed and Miss Melrose, on the patients receiving shock therapy as a form of treatment for schizophrenia. In conjunction with this project, purely experimental work has been undertaken in this Department in an endeavour to study, experimentally, the many problems which arise from the clinical investigation.

Mr. Goodwin and Dr. H. H. Hyland (of the Department of Medicine have obtained some valuable information from their electroencephalographic studies of epileptic cases from

the Toronto General Hospital. Following the completion of an electroencephalographic unit in that Hospital, this work is progressing rapidly.

Mr. Goodwin, Drs. K. G. McKenzie and E. H. Botterell have been using the electroencephalogram for localization of brain tumours and epileptic foci with excellent results and have started using localizing electrodes at operations on the exposed cortex.

Mr. Goodwin and Dr. W. A. Hawke (of the Department of Paediatrics) have continued their studies of the brain potential changes in "behaviour problem" children and in the convulsive states. Records of normal children are also being obtained.

Dr. D. P. C. Lloyd has been following two main problems. These are: the excitability of ganglion cells and the transmission of impulses through sympathetic ganglia and the transmission of excitation to smooth muscle. The recognition of Dr. Lloyd's work in this field had led to his appointment as an assistant in the Rockefeller Institute.

Assistance was given by Miss Lang and Dr. Janes, to the problem of cholecystitis and liver function, brought to the Department by Dr Dean McDonald of St. Catharines.

Again this year the Department of Medical Research has enjoyed the cooperation and financial assistance of the McIntyre Porcupine Mines and the Ontario Mining Association in the problem of silicosis.

Mr. J. J. Denny and Dr. W. D. Robson, of the McIntyre Porcupine Mines and Dr. D. A. Irwin and Mr. J. H. Johnston of this Department, have continued their experiments on the prevention of silicosis by metallic aluminum.

The original experiments on the prevention of silicosis by aluminum have been repeated on large groups of rabbits. It has been established that in the lung the intimate mixing of one percent. metallic aluminum dust with quartz dust, prevents the development of silicosis up to periods of over two years. Aluminum has been shown to effectively inactivate the quartz retained in the lung, either when inhaled as a mixture with quartz or when inhaled separately. The inhalation of aluminum dust in large quantities over long periods of time, showed no effect on the general health of the

animals and no toxicity or damage to tissue. Metallic aluminum, on being converted into hydrated alumina, reduces the toxicity of quartz in three ways: (a) by flocculation, (b) by adsorbing silica from solution, but (c) chiefly by coating the quartz particle with an insoluble and impermeable coating.

Experiments have been under way for the past year, to ascertain what effect aluminum dust might have on experimental silicosis once that condition is established. The findings to date, though not conclusive, strongly indicate that aluminum dust therapy arrests the usual progress of the disease and aids the lung to eliminate the quartz dust. The experimental work is being continued.

In conjunction with the Technical Silicosis Research Committee of the Ontario Mining Association, Dr. D. A. Irwin and Mr. F. E. Chase are investigating the effect of aluminum on tuberculous infection complicating silicosis. Experimental evidence to date indicates that the addition of minute amounts of silicic acid to cultures of tubercle bacilli increases the growth of the organism in rate and amount. Experiments are being carried out both in vivo and in vitro, to determine if the presence of aluminum influences the localization, spread and subsequent course of tuberculous infection present in a silicotic lung.

Three main problems—chemotherapy, phospholipids and and protein analysis, have been under investigation by Dr. C. C. Lucas and his group.

The chemotherapeutic studies have been synthetic, analytical and biological in nature. The biological investigations include determination of the adsorption and toxicity of the compounds and of their antibacterial activity. Mr. C. Marchant, under the supervision of Dr. Lucas, has prepared a series of derivatives of sulphanilamide. These have been turned over to Dr. P. H. Greey and his associates in the Department of Pathology and Bacteriology, who have studied the antibacterial activity of these and other compounds in vitro and in vivo. The collaboration of the Department of Bacteriology has made it possible to study adequately this aspect of the problem. About twenty compounds have been prepared to date, several of which have promising properties. The studies are being directed particularly towards discovery

of compounds effective against Staphylococcus aureus and Bacillus tuberculosis.

Dr. Lucas has determined the rates of absorption and excretion and the blood concentrations of several of the new compounds following doses of different size given to rats. Chronic toxicity tests are also being conducted. The acute toxicity of these new compounds in mice and guinea-pigs has been determined in collaboration with Dr. Greey.

Dr. Lucas has studied the chronic toxicity of sulphanilamide by feeding groups of rats on diets containing 0.5, 1.0 and 2.5% of the drug. Another group of rats have received the so-called conjugated form (N^4—acetyl sulphanilamide). The animals have been observed for one and a half years; some have been receiving the drug through four generations. Some inhibition of growth at higher dosage and defective spermatogenesis after six months on the drugs were the only signs of toxicity observed. Dr. D. A. Irwin has carefully examined sections from animals sacrificed at intervals, but noted no other evidence of toxic action.

Dr. Lucas has collaborated with Drs. P. H. Greey and D. B. MacLaren (Department of Bacteriology) in some comparative chemotherapeutic studies, using mice experimentally infected with Strep. haemolyticus and Type I Pneumococcus. The relative antibacterial activity of sulphanilamide, dagenan, promin and hydroxyethyl apocupreine was investigated.

Miss M. E. Wheatley and Dr. Lucas have studied the splitting of prontosil in vivo and in vitro, in an attempt to account for the curative effects of this dye, since the hypothesis that activity is due only to liberated sulphanilamide, does not fit all the facts. A diamino-naphthol disulphonic acid, the second product which results from the fission, has now been isolated in pure form and its antibacterial effects are being studied in the Department of Bacteriology.

Miss Wheatley has also assisted Dr. Lucas to devise a semi-micro method for the quantitative study of small calculi (under 80 mg.) from the kidney or bladder. Utilizing this procedure, a series of 100 stones collected by the Department of Urology at the Toronto General Hospital, have been analyzed. Dr. D. R. Mitchell, of that Department, is collaborating in this study from the clinical side. It is hoped

that the information obtained may be used to advantage in choosing diets for patients with a tendency to form stones, thus lessening the recurrence of urinary calculi.

Miss H. Macmorine attempted to devise a micro-method for estimating the drug metrazol (which is being widely used to treat schizophrenia) in tissue extracts. No suitable colorimetric procedure was found. Miss Macmorine later studied the determination of bilirubin and bromsulfalein (a dye used to test liver function) when they are both present in the same blood. She has also assisted Mr. Marchant in preparing new compounds for chemotherapeutic investigations.

Mr. J. Beveridge has continued his examination of the amino acids in the keratin of human hair. A suitable scheme of analysis for such a mixture has been worked out and data on eleven amino acids are now available.

Mr. L. B. Macpherson has fractioned the fatty material extracted from lungs of patients dying of pulmonary tuberculosis. The fractions are being examined chemically and tested for the effects they produce when injected subcutaneously and intraperitoneally. He has also continued his attempts to devise improved methods for the synthesis of phosphatides.

Mr. G. F. Townsend, working under Dr. Lucas, has made a chemical examination of Royal Jelly, the peculiar nutriment upon which queen bees are fed during larval and adult life. This mixture, interesting from the nutritional point of view, has been separated into four main fractions and each is being further studied.

Dr. Bruno Mendel has tested a large number of the higher aliphatic aldehydes for their effect on the matabolism of normal cells and tumour cells. Some of these aldehydes (heptaldehyde, citral) were found to inhibit the Pasteur reaction in tumour cells in minute amounts. The application of these findings to experimental tumours is under investigation.

Miss D. Mundell, working as an Eli Lilly Fellow, under the direction of Dr. Mendel, has made detailed studies on the choline-esterase in a large number of tissues of different plant and animal species. Whereas, various amounts of choline-

esterase were found in all the animal tissues so far investigated, tumour cells did not show any esterase activity.

Miss Mundell's work towards purification of the choline-esterase resulted in obtaining a highly purified preparation from mouse liver. As larger amounts of the esterase were needed for experimental work on animals, Miss F. Strelitz developed a method for the purification of the esterase from horse serum. With this preparation, which was purified from 200-300 times, many experiments on animals were carried out, in order to determine the pharmacological effect of choline-esterase under various conditions. This work is being continued.

The work of the Department has been aided to a great extent by grants from the following:

The Banting Research Foundation.
The Josiah Macy Jr. Foundation, New York.
The McIntyre Porcupine Mines, Limited.
The Ontario Mining Association.
The Scottish Rite Masons, Northern Jurisdiction.
The Eli Lilly Company, Indianapolis.
The Rockefeller Foundation, New York.

The Department wish to express their thanks for this financial assistance. We also wish to acknowledge the gift of 200 milligrams of radium from Mr. Gilbert A. LaBine, in memory of his son, Leonard.

The Dr. James Page Rutherford Fellowship has been awarded to Dr. E. J. King of the British Postgraduate Medical School, London. Dr. King will spend three months working in this Department.

REPORT OF THE WORK OF THE COMMITTEE OF EXPERIMENTAL RESEARCH

During the past year (July 1, 1938—June 12, 1939), a total of 1,225 operations requiring sterile equipment, total anesthesia and recovery care were performed. These operations were conducted by members of the Departments of

Surgery, Medicine, Oto-laryngology, Pathology and Bacteriology, Pathological Chemistry and Medical Research, as follows:

Dept. of Surgery:		
Dr. R. I. Harris—Gastro-intestinal	31	operations
Dr. D. W. G. Murray—Arterial, Venous grafts	79	"
Dr. S. Gordon—Skin grafts	83	"
Dr. S. Gordon—Transplantation of bone	8	"
Dr. K. G. McKenzie—Brain, E.E.G. preparation	4	"
Dept. of Medicine:		
Dr. R. A. Cleghorn—Sympathetico-adrenal	195	"
Dr. A. Parks—Experimental nephritis	12	"
Dept. of Pathology and Bacteriology:		
Dr. P. H. Greey—Cerebral injections	2	"
Dept. of Oto-laryngology:		
Dr. J. A. Sullivan—Nerve graft	1	"
Dept. of Pathological Chemistry:		
Dr. T. F. Nicholson, Dr. R. W. I. Urquhart and D. L. Selby—Experimental nephrosis	93	"
Dept. of Medical Research:		
Dr. J. M. Janes and Dr. F. G. Banting—Experimental fibrosis—lung	10	"
Dr. J. M. Janes—Experimental hypertension	79	"
Dr. J. M. Janes and Dr. D. McDonald—Gall bladder	76	"
Dr. C. G. McEachern and Dr. G. E. Hall—Cardio-vascular	237	"
Dr. D. P. C. Lloyd—Nerve potential experiments	9	"
Dr. I. W. Mann—Coronary blood flow	42	"
Mr. G. W. Manning—Coronary artery reflexes	51	"
Mr. W. K. Kerr and Mr. J. E. Goodwin—Cortical operations	8	"
Mr. F. Thomson—Hypophysectomy and adrenal-ectomy	205	"

Of these operations, 299 were performed under intratracheal ether—with pre-operative morphine; 54 were performed under nembutal and intratracheal insufflation, while 823 were carried out under ether inhalation with pre-operative morphine sedative. Forty-nine operations were performed under intravenous nembutal anaesthesia.

In addition to the sterile operations outlined above, some 150 animals had additional anaesthetics (nembutal) prior to subsequent acute experimentation in the kymographic room (Dept. of Medicine). An equal number of animals were also used by the Fellows of the Department of Medical Research for later acute experiments requiring anaesthetization.

Many chronic feeding and injection experiments were carried out by Mr. Cowan in conjunction with various

members of the Departments of Pathology and Bacteriology, Medicine and Medical Research. This service occupies some 2½ hours per day of Mr. Cowan's and his assistant's time. Bleeding the sheep for the Bacteriology Department and the Toronto General Hospital is also carried out by the workers under the Committee of Experimental Research.

The care and feeding of the animals in the animal quarters requires six full-time workers. Three of these men are paid by the Department of Medical Research, which also contributes to the cost of feed and assists with the maintenance and repair of cages, etc.

The average population in the animal quarters is as follows:

Dogs	120
Cats	30
Sheep	2
Chickens	130
Rabbits	300
Rats	1,000
Mice—	
(animal quarters)	1,200
(5th floor corridor)	3,000
Guinea-pigs	150

Just recently, through the generosity of the Board of Governors, a grant has been made to cover the cost of installing a new and adequate incinerator. To meet the pressing need for more space in the animal quarters to house our increasing animal population, the Department of Medical Research contributed $3,000.00 for alterations and the construction of 76 new dog cages.

During the past year Mr. Cowan has also prepared, including blocking, cutting and staining, approximately 2,500 microscopic sections for Drs. Harris, Gordon, Murray, Cleghorn and Nicholson.

During the academic year Mr. Cowan has also assisted Dr. F. I. Lewis in the preparation for the 6th year fracture classes, conducted in Room 508 of the Banting Institute.

Department of Medical Research Addresses Given

June, 1938—June, 1939

Banting, F. G.: "Resistance to Experimental Cancer", W. E. Dixon Memorial Lecture, Royal Society of Medicine, London, England, October 11, 1938.

FRANKS, W. R. AND F. G. BANTING: "Hormones and Immunity", American Association for Advancement of Science, Ottawa, June 29, 1938.

FRANKS, W. R.: "Some Chemical Approaches to the Cancer Problem", Colloquium on Organic Chemistry and Medical Research, University of Toronto, January 6, 1939.
"Conjugation of Some Aromatic Isocyanates with Casein", Toronto Biochemical and Biophysical Society, March 16, 1939.

GOODWIN, J. E., G. E. HALL, B. LEIBEL AND D. P. C. LLOYD: "Bioelectric and Other Physiological Responses of Insulin and Metrazol", American Association for Advancement of Science, Ottawa, June 29, 1938.

GOODWIN, J. E.: "Effect of Pentamethylenetetrazol Upon the Cortical Potentials of the Rabbit", Toronto Biochemical and Biophysical Society, October 27, 1938.

HALL, G. E.: "Neurogenic Influences in Experimental Coronary Artery Disease", New England Heart Association and Suffolk District Medical Society, Boston, October 26, 1938.
"Experimental Arteriosclerosis of Neurogenic Origin (in Rats)", Toronto Biochemical and Biophysical Society, October 27, 1938.
"Human Electroencephalography", University of Toronto Physiological Society, November, 1938.
"Experimental Heart Disease", Hartford Retreat, Hartford, Conn., March 29, 1939.
"Physiological and Biochemical Responses to Metrazol Convulsions (Schizophrenia)", Hartford Retreat, Hartford, Conn., March 29, 1939.
"Coronary Artery Reflexes in Acute Occlusion (Experimental)", American Medical Association Meeting, St. Louis, May 15, 1939.
"The Autonomic Nervous System and Cardiovascular Disease", American Medical Association Meeting, St. Louis, May 15, 1939.

IRWIN, D.: "The Prevention of Silicosis by Metallic Aluminum", American Association of Industrial Physicians, Albany, N.Y., November, 1938.
"The Prevention of Silicosis by Metallic Aluminum", Academy of Medicine, Toronto, March 28, 1939.

JANES, J. M.: "New Facts on Resuscitation of the Apparently Drowned", Ontario Medical Association, Woodstock, September 28, 1938.
"Experimental Hypertension", Academy of Medicine, Toronto, March 28, 1939.
"Cardio-biliary Tract Relationship", Department of Pathology Staff Meeting, March, 1939.

LLOYD, D. P. C.: "The Relationship between Preganglionic Fibres and Ganglion Cells in the Automatic Nervous System", International Physiological Congress, Zurich, Switzerland, August, 1938.
"The Potential Waves and Excitation States of Ganglion Cells", Toronto Biochemical and Biophysical Society, November 17, 1938.
"Action of Piperidino Methyl-3-Benzo Dioxane (933 F) on Transmission to Smooth Muscle", Toronto Biochemical and Biophysical Society, April, 1939.

LUCAS, C. C.: "Recent Advances in Chemotherapy", Colloquium on Organic Chemistry and Medical Research, University of Toronto, October 28, 1938.
"Sulphanilamide in Body Fluids", Canadian Society od Laboratory Technologists, Hamilton, December 9, 1938.

MCEACHERN, C. G. AND G. E. HALL: "Some Coronary Artery Reflexes of Physiological Importance", Toronto Biochemical and Biophysical Society, November 17, 1938.
"Coronary Artery Disease (Experimental)", Academy of Medicine, Toronto, March 28, 1939.

MARCHANT, C.: "Recent Developments in Studies on Bios", Toronto Biochemical and Biophysical Society, October 27, 1938.
THOMSON, F. B. AND W. R. FRANKS: "The Influence of Hypophysectomy on Hemolysin Production in Rats", Toronto Biochemical and Biophysical Society, March 16, 1939.
TOWNSEND, G. F.: "A Preliminary Report upon the Chemical Nature of Royal Jelly (the Nutriment which Produces and Maintains the Queen Honey Bee)", Toronto Biochemical and Biophysical Society, March 16, 1939.

ART SERVICE

(Under the direction of Miss Maria T. Wishart)

The expanding range of subjects to which the Art Service has been able to contribute is gratifying. Experience, the best teacher, has gradually built up a knowledge that cannot be acquired any other way, so it is with more assurance that we tackle the greater variety of work.

Dr. J. H. Couch has approached the repair of ventral and inguinal hernia from an unusual standpoint, by using a piece of pliable netted silk which can stretch in any given direction, to a limited distance. The net, inserted over the weakened wall, is fastened in place. We have made pen and ink drawings of these, which are to be used shortly for publication.

A singular case came our way from Dr. Beverley Hannah, Hospital for Sick Children, namely, a diphtheritic membrane of the ear. A coloured record of this was made at the Isolation Hospital.

Dr. J. H. Couch is writing a manual on "Surgery of the Hand," to be published by the University of Toronto Press. Some thirty simple pen and ink illustrations were made for this, many of the drawings being made from actual cases seen on the ward or at clinic. This work follows up the pen and ink illustrations previously published, of paronychia, whitlow and tendon sheath infection.

A graphic case of Darier's Disease was recorded in the form of a wax model for Dr. E. J. Trow, Dermatology. The patient's back, chest, legs and arms were covered with crusty papules wich occasional ulceration. A model was made of the right leg and foot. The nature of the disease made this an exceedingly difficult record to get, but the final result was satisfactory.

A striking case of angiomatosis retinalis, a complication of a cerebellar tumour previously operated upon, was asked for by Dr. A. E. MacDonald, the fundus oculi to be drawn from his history notes and thumb nail sketches. To the artist, such requests are very disturbing, as we cannot help feeling that such a record might be far from accurate, in fact, misleading. Fortunately, the patient turned up unexpectedly and we were able to get an all too short glimpse of the field, which proved to be exceptionally interesting and intricate in detail.

Dr. R. J. A. McComb brought in a surgical autopsy specimen of a uretero-sigmoid transplant. The colour was gone and the sigmoid had been split. We built up the specimen by suturing the edges together and filling with marbles. From this we made a negative cast. The positive cast in wax was then modelled to look like fresh material. Fresh autopsy material was obtained for colour matching and two models showing uretero-sigmoid anastomosis with abscess of transplant were made. The models were on exhibition at the Canadian Medical Association Meeting and will be shown next fall at the meeting of the American Urological Society. The cooperation of the Department of Pathology in providing fresh material for assistance in the preparation of these was very much appreciated.

Interesting and out of the ordinary work was called for, when Dr. J. H. Couch asked for illustrations for his paper entitled "Hippocrates' Hawley Table", to be presented before the Historical Section of the Canadian Medical Association. The drawings illustrated the detail of construction and the technique of using the ancient scamnum for the reduction of the various dislocations which occur at the hip.

Two uncommon gynaecological anomalies were recorded in half-tone drawings, one a case of embryonic abnormality of Müllerian ducts for Dr. J. C. Goodwin, the other a uterus with double fundus for Dr. W. A. Scott. A chorio-epithelioma of the uterus, and a carcinoma of the cervix, complicated by pregnancy, were also illustrated in the same manner.

Hands illustrating a striking example of generalized scleroderma with Raynaud's disease, were sketched in water-colour for Dr. H. E. Rykert.

A series of sketches of oesophago-gastrostomy on a dog, performed by Dr. R. I. Harris and Mr. A. Till, incorporating special points which have not been illustrated before (*J.H.H. B.*, Vol. 34, 1923), were made. Dissections of this region in the dog were carried out in order to fill in missing details in the operative sketches.

Two pen and ink drawings were made to illustrate intra-cerebral haemorrhage from rupture of berry aneurysms, and the possible locations of aneurysms on the circle of Willis, for a paper by Dr. H. H. Hyland and Dr. J. C. Richardson, to be published shortly.

We were able to get a good sketch of a parathyroid adenoma which Dr. R. I. Harris removed in a case of peculiar interest.

An interesting exposure of the fourth ventricle was sketched in the operating room, when Dr. K. G. McKenzie removed a right cerebellar papillomatous tumour of the choroid plexus of the fourth ventricle. A record of acute osteomyelitis of the frontal bone was made. Pen and ink and water-colour sketches were also made of a cyst of the third ventricle, protruding through the foramen of Munro into the lateral ventricle. It is expected that the latter will be added to the Pathology museum.

Two water-colour studies were made of microscopic sections for Professor William Boyd, Pathology, one of coronary thrombosis and one showing glycogen in renal tubules. These will probably furnish illustrations for a future textbook

Many more drawings than those enumerated above were made during the past year. Twenty-seven members of the Faculty from thirteen departments and sub-departments have availed themselves of the Art Service.

ANNUAL REPORT

Art Service, Faculty of Medicine

July, 1938—June, 1939

Summary of Work of Art Service

1. According to medium of work:

1. Water-colour	6
2. Half-tone	6
3. Pen and ink	59
4. Pencil drawings	13
5. Wax models	4
6. Sketch	1
Total	89

2. According to departments:

1. Anatomy	1
2. Dermatology	1
3. Hygiene	1
4. Medicine	4
5. Neuro-Pathology	4
6. Obstetrics and Gynaecology	7
7. Neuro-Surgery	5
8. Ophthalmology	1
9. Pathology	3
10. Pathology, H.S.C.	1
11. Surgery	57
12. Surgery, H.S.C.	3
13. Surgery, St. Michael's	1
14. Urology	2
Total	89

3. Number of members of Faculty for whom work was done . . 27

REPORT OF THE MEDICAL SOCIETY

Honorary President . . . . . Dean W. E. Gallie
Honorary Treasurer . . . . . Professor Duncan Graham
President . . . . . C. C. Gray
Vice-President . . . . . W. L. C. McGill
Secretary-Treasurer . . . . . W. E. Ortved
Assistant Secretary-Treasurer . . . . . O. W. Oughtred

The Medical Society is the body elected yearly by the students in Medicine, to act as intermediary between students and Faculty, to carry out the business administration, and to be responsible for the various committees dealing with student activities.

The Medical Journal this year has proved itself an

even finer publication than ever before It is an undergraduate publication, gathering together valuable scientific articles written by staff members and students of all six years. John Belton, as Editor-in-Chief, Ken Greer as Associate Editor, and Norman Hillary, Managing Editor, and their staff, are indeed to be congratulated on their fine work. Though this journal has its widest circulation among the students, many graduates have availed themselves of the opportunity of subscribing this year, as in the past. The Journal again proved to be financially self sustaining, ending the year with a slight surplus.

"Daffydil", the students' annual show, again took Hart House theatre by storm and sold out for three consecutive nights. "Daffydil" is also able to show a positive balance on the ledger.

The Medical-At-Home Committee, under the leadership of Bill McGill, brought Bunny Berigan, another great band from the States, to play for the annual At-Home. True to tradition, this event was an outstanding social success. The Committee was unfortunate in being unable to secure enough room in the Royal York hotel for a Friday night engagement, and as a result, the dance was held on the last Thursday in January. This did not affect the turnout to any marked degree, however.

Bob Braiden, the president of sixth year, carried out his duties well as chairman of the Graduation Banquet Committee. The Medical Society continued the precedent adopted last year, of making a gift of one hundred dollars towards this affair, and thus lowering the individual cost considerably. This move showed its worth, as the graduating year turned out one hundred per cent.

Though it is common practice for the Medical Society to have several open meetings during the year, at which outstanding men are asked to speak to the students at large, this year there was but one, early in the fall, at which Dr. Stanley Ryerson, the Assistant Dean, was the speaker.

This year despite a few added expenses, the Medical Society is left with a substantial balance, of which the greater proportion will be turned over to the Bursar to swell the Bursary fund.

Growing rapidly since its instigation last year at the University of Toronto, the Canadian Association of Medical Students and Internes now includes seven Canadian Universities. At its second annual convention held at the beginning of February, in Hart House at the University of Toronto, a definite constitution was adopted and plans made to extend the work so far accomplished with regard to students' health, prevention of tuberculosis, and appointment of internes. Regarding the last mentioned field, Toronto is the centre of this work and plans are being set forth during the summer, in an endeavour to get a new system for the appointment of internes under way by next fall. The plan will require the cooperation of all hospitals in Canada, and if this is achieved, a more rational and efficient method of interne appointments will certainly be the result. The National Executive, which has been resident in Toronto during the past year, will turn its work over to a newly elected Executive at Queen's University, who will carry on for the year 1939-40. Cyril K. Benson is the new President. In addition to its student executive, the C.A.M.S. & I. has an imposing Advisory Board, made up of outstanding professors from most of the Canadian Universities and with Sir Frederick Banting as Chairman of this board. By advice from these men the C.A.M.S. & I. hopes to be guided along a conservative path in all its activities.

The Society owes a special vote of thanks to Dr. Ryerson and his assistants, Misses Jones, Russell and Perry, for their fine cooperation and help during the past year.

Bill McGill, who has been a member of the Society for two years, and last year held the office of Vice-president, will assume the duties of President for the coming year In his hands the fate of the Society will rest safely for another year.

MEDICAL ATHLETIC ASSOCIATION

Honorary President.....Professor William A. Scott
President.....B. Laski
Vice-President.....J. A. Boyd
Secretary-Treasurer.....M. P. Townsend

This year has seen no radical changes in the workings of the Association. Although our expenditures were slightly higher

than last year, they were within the grant received from the Medical Society. This increase is easily explained by three more teams being entered in Interfaculty competition.

In the matter of championships we fared better than for several seasons past. No less than three major trophies were brought to the Faculty. These consisted of the "Mulock" Cup, emblematic of Rugby supremacy, the "Arts" Faculty Cup, emblematic of the Soccer championship, and the "Spalding" Cup, indicating the winning of the Baseball league. This was the first time that Meds. have held the "Arts" Faculty Cup for Soccer since its foundation in 1894.

Following the precedent of last year's Executive, we endeavoured to bring more students into sports, both by increasing the number of teams and stimulating interest in lagging departments. The interfaculty tennis tournament was started too late in the season and a winner was not declared. However, it is hoped that next year's Executive will be more successful with this innovation.

Forty Medical "M" 's were awarded this year to athletes fulfilling the requirements demanded. The slight increase is explained by the championships won. In addition, a sum has been set aside to purchase bronze medallions for members of these championship teams. This is the revival of an old custom existing a few years ago in the Association.

The Athletic Cane went to Cam Gray this year, for his excellent showing on the Varsity Rugby team for several seasons. During this time his field goals have become legendary throughout Inter-collegiate circles. The Faculty will sorely miss such graduating men as Gray, Holden and Graham, in whose reflected athletic glory we have basked for so long.

Perhaps the most outstanding athletic interfaculty competition this year was "Jersey Jim" Emmett of fifth. He played on no less than six teams, including the three championship teams.

Thanks to the careful preservation of last year's equipment, we found it unnecessary to expend the usual appalling sum on the Rugby team, and so were able to better outfit our other long suffering teams. Particularly in hockey were we able to purchase some long needed equipment.

The skeleton of a plan for bringing more teams into competition without increasing the cost of maintenance, has been handed on to next year's executive and we hope and trust that in their able hands it will be carried to completion.

MEDICAL WOMEN'S UNDERGRADUATE ASSOCIATION

Honorary President.....Dr. A. A. Curtin
President.....Dorothy Redmond
Vice-President.....Helen Holden
Secretary.....Sue Adams
Treasurer.....Jeanne Montgomery

The Medical Women's Undergraduate Association has a very successful year, with an excellent attendance at all meetings and social functions.

The initiation of the freshies was the first event of the year. This took the form of the usual candle lighting service, followed by an hilarious entertainment, provided by the freshies for the girls of the upper years and the guests.

The November high light was a tea meeting at which Miss Nore Lee, of the Children's Aid Society, spoke of the problems of adoption and of the part played by doctors in social work.

The Christmas function this year was a Children's party with a Santa Claus, presents, a children's concert and games. The toys, along with the canned goods supplied by each member, were later taken to the University Settlement for distribution to needy families.

The girls were at home to their professors and their wives in February at the time honoured "Nabob" Tea.

At the March meeting, Dr. Jessie Gray spoke of interne and postgraduate work, giving many valuable suggestions and much sound advice.

The girls of the graduating year were honoured in April by a delightful evening party given by the fifth year members of the society.

The climax of the year came with a chapel service held in Knox College, at which Dr. Marion Hilliard gave an inspiring address to the girls of the graduating class. This was arranged by the Medical Women's S.C.M. in conjunction with the

Women's Undergraduate Society. The Medical Alumni members also assisted and helped to make it the great success which will certainly establish it as an annual service.

MEDICAL WOMEN'S ATHLETIC ASSOCIATION

President.....Barbara Watts
Vice-President.....Doris Prowse
Secretary-Treasurer.....Margaret McFarlane

The Medical Women's Athletic Association has completed a very successful year.

We began the year with a bang, by buying ourselves the "Interne like" tunics, described as such by the "Varsity". Hockey, badminton, tennis and golf were the other sports participated in by the women.

Our incoming President, Marjorie Mosbaugh, has brought the medical women honour by her achievement in tennis and golf, and has filled us with great enthusiasm for the coming year.